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REPORT ON MONITORING OF POPULATION TRENDS

SUMMARY

This report[*] is the third in a series prepared pursuant to a recommendation of the World Population Plan of Action that monitoring of population trends and policies should be undertaken continuously as a specialized activity of the United Nations and reviewed biennially by the appropriate bodies of the United Nations system, beginning in 1977.

The part on monitoring of population trends, which is presented in this document covers world and regional population growth, fertility, nuptiality, mortality, age structure, international migration and urbanization. Furthermore, the interrelationships between population and development were highlighted as a special topic, emphasizing, inter alia, relations between fertility, mortality and socio-economic variables, socio-economic differentials in mortality, health and population, the causes and consequences of internal migration in developing countries, the economic and demographic determinants of labour force participation, demographic aspects of changes in consumption, demographic characteristics of women's work, the potential population supporting capacities of lands and the economic disparities associated with socio-eemographic development.

The second part, dealing with population policies, is presented in document ESA/P/WP.69.

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[*] Preliminary version to be finalized after review by the Population Commission at its twenty-first session held in New York from 26 January to 4 February 1981.

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PREFACE

The World Population Plan of Action, adopted by the United Nations World Population Conference at Bucharest in 1974, recommended that monitoring of population trends and policies "should be undertaken continuously as a specialized activity of the United Nations and reviewed biennially by the appropriate bodies of the United Nations system, beginning in 1977". 1/ The present report is the third in a series of reports on this activity. The report of the first round was prepared in 1977 2/ and the report of the second round was prepared in 1979. 3/

The outline of this report was based on the discussion at the twentieth session of the Population Commission. 4/ In addition to a general survey of the world population situation, special topics dealing with the relationships between population and development were included, emphasizing such important areas as the association between fertility, mortality and socio-economic variables, the developmental aspects of mortality differentials, the causes and consequences of internal migration in developing countries, the determinants of labour force participation, with special emphasis on the demographic characteristics of working women, the demographic impact on consumption patterns, the population supporting capacity of agricultural land and the disparities associated with socio-demographic development.

Prior to the report on the first round of monitoring, the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat had carried out numerous assessments of population trends. Mention should be made, for instance, of The World Population Situation in 1970, 5/ Population Bulletin of the United Nations, No. 7 - 1963, with special reference to conditions and trends of fertility in the world, 6/ Levels and Trends of Fertility throughout the World, 1950-2000, 7/ The Situation and Recent Trends of Mortality in the World, 8/ Growth of the World's Urban and Rural Population, 1920-2000; 9/ and three consecutive reports 10/ on World Population Prospects as Assessed in 1963, 1968 and 1973.

The present report on monitoring of population trends was prepared by the Population Division on the basis of inputs by the Division itself, the International Labour Organization, the Food and Agriculture Organization of the United Nations, and the World Health Organization. The regional commissions also contributed information which was helpful in preparing the various chapters. The report on monitoring of population policies was prepared by the Division, on the basis of information derived from the Fourth Inquiry among Governments on Population and Development, as well as from other official sources.

1/ Report of the United Nations World Population Conference, 1974 (United Nations publication, Sales No. E.75.XIII.3), part one, Chapter 1, para 107.

2/ United Nations publications, Sales Nos. 78.XIII.3 and 4.

3/ United Nations publications, Sales Nos. E.79.XIII.4 and 5.

4/ See Official Records of the Economic and Social Council, Supplement No. 2, (E/1979/22).

5/ United Nations publication, Sales No. E.71.XIII.4.

6/ United Nations publication, Sales No. 64.XIII.2.

7/ United Nations publication, Sales No. 77.XIII.2.

8/ United Nations publication, Sales No. 62.XIII.2.

9/ United Nations publication, Sales No. E.69.XIII.3.

10/ United Nations publication, Sales Nos. 66.XIII.2, E.72.XIII.4 and E.76.XIII.4.

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I. OVERVIEW OF RECENT POPULATION TRENDS AND POLICIES

INTRODUCTION

As the twentieth century draws to a close, the evidence continues to mount that a movement towards fertility decline in the developing countries is under way and the trend of moderation in the rate of growth of world population is sustained. Recently revised estimates by the Population Division indicate that the annual rate of growth of the world population may decline to 1.5 per cent by the end of the century, from 1.7 at present and 2.0 per cent fifteen years ago. To be sure, the decline is small and its significance lies mainly in its persistence and anticipated acceleration. Otherwise, substantial population increase, mainly in many of the developing countries, will persist and will continue to be among the major factors influencing the present and future of humanity.

The decline in the birth rate in developing countries from 41 per thousand during 1960-65 to 32 per thousand at present was largely brought about by declines in China and in several East Asian, South Asian and Latin American countries. However, no decline is yet apparent in Africa and South Asia. The developed countries, on the other hand, continue to experience a decline in fertility.

Declining fertility in the developing countries has caused a corresponding decline in the proportion of child and young population (aged 0-14) from 42 per cent in 1970 to 39 per cent at present. The old age component in developing countries, though relatively small, is growing rapidly.

Mortality regained world attention in the 1970s as a serious demographic problem amid signs of a slackening in the rate of decline. In particular mortality remains high in most Sub-Saharan countries of Africa and life expectancy there will probably fall short of targets set for 1985 by the World Population Plan of Action.

The imbalance between urban population growth and the availability of essential services and employment is also causing serious problems, particularly in the developing countries. The continued flow of migrants from rural to urban areas is parallelled by movements of workers from poorer to richer countries. A new pattern of international migration is the flow of migrants to the oil rich countries of Western Asia. Another recent trend of international migration is the increasing number of refugees. Of the 8.0 million refugees, 6.4 million were found in developing countries.

The trends in population growth, fertility, mortality, age structure, urbanization and international migration along with a number of studies on the interrelationships between population and various aspects of socio-economic development, are introduced in this overview. A more detailed treatment of these subjects is set forth in the main body of this report.

POPULATION TRENDS

World and Regional Population Growth

While the demographic conditions in the developed countries are becoming more and more homogeneous, there is a large degree of heterogeneity among the developing countries. Thus, due to different demographic circumstances, the major developing areas of the world have different levels and trends of their growth rates. 1/ Africa, with very high levels of fertility and generally high and declining mortality, has the highest rate of growth in the 1975-80 quinquennium, namely 2.9, and the recent trend in this rate has been increasing, mainly as a result of mortality decline. Africa is followed by Latin America where, because fertility decline has been relatively rapid, the average rate of growth during the last five years was 2.5. East Asia has been experiencing a rapid decline in its rate of growth, which was estimated at 1.4 per cent during 1975-80, due largely to the rapid fertility decline in China. In South Asia, there has only been a small decline in the rate of growth, which was about 2.4 until recently and which now stands at 2.2. Highest growth rate observed during the last quinquennium in a developed region was 1.2 in Australia/New Zealand, and the lowest were 0.05 in Western Europe and 0.1 in Northern Europe while both Northern America and the USSR had growth rates of 0.9.

The United Nations demographic projections anticipate a rate of growth of 1.7 for the world in the 1980's, 0.7 in the developed regions and 2.1 in the developing regions. Africa is the only area where an increasing growth rate is projected, in anticipation of continued though slow mortality decline and an even slower fertility decline. Annual growth rates of 3.0 or higher are consequently expected in Western and Eastern Africa during the remaining two decades. Though the average rate for the developing countries as a whole is expected to be 2.0, rates between one and two per cent are anticipated in the Caribbean, Temperate South America and China. All developed regions are expected to maintain rates below one, with the possible exception of Australia and New Zealand.

1/ Growth rates refer to per cent, per annum.

Decelerating rates of growth during the 1990's are projected in 22 out of the 24 regions into which the world is divided in the United Nations projections. In the last decade of the century, three per cent rates of growth are expected to disappear; and China and Temperate South America are expected to have rates near one per cent. The only two regions where the projections anticipate increases are Northern and Western Europe where the current rates are very low.

Projections beyond the year 2000, naturally involve more uncertain assumptions. Assuming moderately declining fertility trends in all the presently high fertility countries, and a modest increase in fertility among those that currently have low fertility, the medium variant projects a total population of 6,900 million in the presently developing countries in the year 2025, with a rate of growth of 1.1 or about half the present rate. On the other hand, a total population of 1,400 million is projected for the developed countries, and their growth rate is estimated at 0.2 or virtually nil. Hence the world population is projected to increase to 8,300 million in 2025, thus doubling its 1975 size within 50 years (the low and high variant estimates are 7,200 and 9,200) with a rate of growth at that time of about one per cent (0.6 and 1.4 according to the low and high variants respectively).

Thus by the end of the first quarter of the coming century, it is projected that almost 85 per cent of the world's population would be living in the presently developing countries, compared to 75 per cent at present. The projections to the year 2025 anticipate a tripling of the population of Africa, an increase of 150 per cent in Latin America, a doubling of the population of South Asia and an increase of a little below 50 per cent in China, by which time the annual rate of growth in China will have dropped to 0.4, compared to 1.9 in Africa, 1.6 in Latin America as a whole, and 1.0 in South Asia.

Fertility

The picture provided by recently available estimates of fertility levels and trends in Asia is one of continuing decline. This trend is of course substantially influenced by China where estimates indicate that the birth rate has reached a level below 20 in the late 1970's, and a further decline is expected. Hong Kong and Singapore also had low levels nearly equivalent to those of the developed countries, namely about 17 per thousand in 1978, about half of their levels in the early 1960's. Levels below 30 have also been attained in the Republic of Korea and Sri Lanka and there is evidence of considerable fertility decline in Indonesia. Elsewhere in Asia, the traditionally high levels of fertility are still dominant in most of the Indian Sub-Continent as well as in the Arab countries of West Asia.

There is little evidence of any decline in Africa; birth rate levels of 45 and above still prevail, particularly in Western and Eastern Africa. Some Central African countries show lower levels, which are thought to be due to health and nutrition rather than to deliberate fertility control. The scanty data on trends suggest that birth rates may have increased in some countries, possibly as a result of improving health, decreasing prevalence of venereal disease and other fecundity-impairing ailments, and shortening periods of breast feeding.

Compared to Asia and Africa, Latin America, has lower and better documented fertility levels. With but one exception all the Caribbean islands have birth rates below 30, among the lowest in developing world and all countries in Temperate South America have rates below 25. Elsewhere in Tropical South America and in Middle America, impressive declines to levels below or near 30 are indicated in Costa Rica, Panama and Colombia, and there is evidence of some decline in the larger countries, Mexico, Brazil and Venezuela. However, very high levels still exist in the remaining countries in these two regions, with no indication of a decline.

The extent of the fertility decline in the developed countries can be realized from the observation that, with the exception of Ireland, all countries of Northern and Western Europe and also Northern America have maintained below replacement fertility levels since early in the Decade of the 1970's.

This group of countries has more recently been joined by Italy, Australia and New Zealand. Several countries in Southern Europe are also close to replacement, indicating a continuous convergence of levels. The general trend in the Western developed countries is still downwards, although in recent years the decline has been mostly small or nil. The decline in these countries has been brought about more by reducing births of third and higher order than by curtailing those of lower order. Slight increases in fertility have been observed recently in a few developed countries, but it is too early to know whether the change is indicative of a genuine trend.

In the East European countries, fertility has been slowly increasing during the late 1960's and the first half of the decade of the seventies. This was largely brought about by pro-natalist policies ranging from family allowances to restriction of abortion. This trend seems to have terminated and it is only in the German Democratic Republic that, the total fertility rate rose after 1975. Despite these differences between socialist and western countries in their fertility trends and the fact that fertility levels are generally higher among the former, it should be realized that levels in most socialist countries are not far from replacement.

Considerable efforts have been made to understand the determinants of fertility levels. Methodological difficulties and lack of detailed information, particularly in developing countries, have limited our knowledge mainly to socio-economic correlates such as education, occupation and type of place of residence, each of which is a complex indicator composed of social and economic elements as well as others reflecting values and attitudes. Within the developed countries, recent information, including the results of the World Fertility Survey, seems to indicate that fertility is less related to social, economic or cultural conditions than ever before. Differences between urban and rural areas, sub-regions within countries, income groups and religious groups have been considerably narrowed.

Some recent information on the correlates of fertility in developing countries is provided by the World Fertility Survey for 15 of these countries. Inter-country comparisons which generally indicate a negative relationship between fertility level and socio-economic status are facilitated and rendered more accurate by the standardized procedures followed in the Survey. In the case of education, data from the Latin American countries included, when analyzed by marriage cohorts, show an inverse relationship between education and the number of children ever born in each cohort. In the Asian countries included in the survey, a general negative relationship also existed with the exception of Indonesia where parity increased with education.

Similarly, a lower urban than rural parity differential is also generally shown by the results, although the extent of the difference varies substantially. Uncertainty as to whether the divergences from this pattern due to such factors as improvement in health and nutrition in rural areas or to differences in stability of marriage demonstrates the need for a deeper analysis than that provided by the urban-rural dichotomy.

Some information regarding fertility and labour force participation of women is also provided by the Survey. In six out of seven countries it was found that, among women with 10-19 years of marriage, those who had ever worked since marriage had somewhat lower parity than those who had not. The differentials between women who worked before marriage only and those who never worked were small. The Survey results also confirm that women in white-collar and professional occupations tend to have smaller families than those in blue-collar and service occupations, while agricultural workers generally have the highest fertility level. It has also been found, that the relationship between fertility and wife's occupation was similar to the relationship between fertility and the occupation of the husband.

A main factor in the fertility decline observed in many developing countries is the use of contraceptives, information about which was also provided by the World Fertility Survey. The results from 20 developing countries 2/ were available at the time of this writing. While these countries cannot be regarded as representative of all developing countries, the group includes populations of different cultural and economic backgrounds. The results show a high level of awareness of contraception in most of the countries surveyed; in all of these 20 countries except Nepal, at least three quarters of ever married women of reproductive age have heard of a modern method. Needless to say, knowledge does not imply practice, and in each of the nine countries for which the information is available, the percentage of those who knew of a family planning outlet was lower than the percentage that knew of a modern method. Thus in many countries substantial numbers of women, often a large majority, do not know of a place to obtain family planning services. The results also show that women with little education and rural women are usually less likely than others to know of where to get these services.

World Fertility Survey results indicate that a relatively high degree of contraceptive use exists in Latin America. The proportion of currently married women in the reproductive ages who have ever used contraceptives ranged from 47 per cent in Mexico to 84 per cent in Costa Rica. The range is much wider, and the level lower among the eleven Asian countries, from 6 per cent in Nepal to 69 in Fiji. In Latin America this proportion ranged from 30 per cent in Mexico to 64 in Costa Rica and in Asia it ranged from

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2/ Colombia (1976), Peru (1977), Guyana (1975), Panama (1976), Costa Rica (1976), Mexico (1977), Dominican Republic (1975) and Jamaica (1975-76) in Latin America; Republic of Korea (1974), Fiji (1974), Philippines (1978), Malaysia (1974), Thailand (1975), Indonesia (1976), Sri Lanka (1975), Bangladesh (1976), Nepal (1976), Pakistan (1975) and Jordan (1976) in Asia; and Kenya (1977) in Africa.

2 in Nepal to 41 in Fiji. Somewhat comparable figures for developed countries indicate that between two-thirds and three-quarters of currently married women are using contraceptives. Available data also indicate that in some of these countries, the proportion of users has doubled in less than 10 years. By contrast, little or no recent change can be seen in other countries.

With only a few exceptions, most family planning in the developing countries is carried out through the use of modern contraceptives. The World Fertility Survey results indicate that the pill is an important contraceptive method in most developing countries and, in many, it is the most frequently used. Thus in 15 out of the 20 countries the pill accounted for 20 per cent or more of contraceptive use, and in Indonesia the proportion exceeded one half. Female sterilization is also popular in some of these countries. The IUD and condom are also important in many countries but generally have fewer users and, except in the Philippines, use of these methods has not increased in relative terms over time.

In all countries the level of contraceptive use increases with family size up to three children. In general, there is little further increase beyond that point, and sometimes there is even a decline. It should be realized, however, that this observation may well be influenced by a cohort effect arising from differences between elder and younger women in their attitudes towards family planning.

The need for family planning services is demonstrated by the observation that in 16 of the 19 countries for which data are available, at least 40 per cent of women who want no more children were not using any contraceptives, and in all but one country over one-fourth of such women were non-users.

It is also important to note that in the developing countries where the use of contraception is fairly widespread, its aim is not solely termination of child-bearing since it is also used for birth spacing. It has been found for instance that the correlation between the "proportion using among those who want more children" and the "proportion using among those who want no more children" exceeds 0.8.

Among the socio-economic factors which could be distinguished from the survey, namely the woman's and the husband's education, rural-urban residence, and the woman's occupation, the woman's education had the most significant relationship to her contraceptive use. With few exceptions, there are very large intra-country differences among educational classes in the extent of contraceptive use. This is true for both husband's and wife's education, but usually the differentials are larger in the case of the woman's education. Although contraceptive use clearly increases with education, the data also imply that family planning has an impact even among illiterate persons.

Differentials by urban-rural residence were also significant. However, for all countries except Indonesia, education related differentials remained large, though somewhat smaller, after the effect of place of residence is controlled. Analysis also showed that, although contraceptive use was rather strongly correlated with the woman's occupation, in some countries there was no significant effect of occupation once the influence of her education was controlled, while in others the effect remained evident though reduced.

Nuptiality

Increasing attention is being paid by demographers to nuptiality, both as a major factor influencing fertility and as a component of family demography. In the developing countries where effective practice of fertility regulation is not yet common, and non-marital fertility is quite limited, age at marriage is a significant factor influencing reproduction. However, it is necessary to discuss developing and developed countries separately because of the vast difference between the two groups.

Throughout Asia marriage is virtually universal; in no country for which data are available does the proportion never married aged 45-49 exceed 7 per cent, and in most areas the percentage is under four. The data show clearly that female age at marriage in East and South-East Asia is more advanced than elsewhere in this major area. The singulate mean age at marriage, as calculated from data representing the period 1970-75, ranged from 20 to 24 years; the only documented exception being Indonesia (1971) where the mean was 19.3. Means are lower in the Indian Sub-Continent and in West Asia, but impressively high in Sri Lanka where in 1971 the mean age was 23.5 years. With only a few exceptions the singulate mean age at marriage is increasing in Asia. The pattern is the same in the case of males, with mean age at marriage generally higher by 3-5 years. A case worth noting again in this regard is Sri Lanka where the male singulate mean age at marriage had already reached 28 years in 1971, which is higher than in most developed countries.

The prevalence of marriage in the large countries of South Asia is evident from the results of the World Fertility Survey which show that the percentage of women aged 20-24 at the time of the Survey who were still single was as low as 5 in Bangladesh (1976) and as high as 61 in Sri Lanka (1975). The question on age at first marriage asked in the Survey provides a similar picture. The increase in age at marriage is shown clearly by a comparison between these data and the corresponding mean ages at first marriage among younger women aged 25-29 at the time of the survey.

Nuptiality data and analysis in Latin America are influenced by conceptual and reporting errors arising from the existence of a variety of forms of sexual unions. Compared to other developed regions, census data in this region show much higher percentages of females, reported as never-married in ages 45-49, ranging from 7 in Mexico (1970) to 32-33 in Guadeloupe and Martinique (1967). Census data also show a relatively high singulate age at marriage: none was less than 19 years among the females in the early part of the 1970's and most were equal to 22 or 23 years. Male averages were higher, generally by three or four years. It is to be noted, however, that cohabitation and reproduction may be taking place earlier in other types of unions.

The rarity in Latin America of early legal marriages compared with the large countries of South Asia is also confirmed by the World Fertility Survey data; in none of the countries surveyed was the mean age at first marriage as low as those prevalent in South Asia. This was true for women aged 40-44, and for women aged 25-29 who were married before age 25. These data do not show any consistent change in age at marriage from the older to the younger cohort, an observation which may be influenced by changes in the incidence of other forms of unions which precede legal marriage. The possibility of reporting error in this regard should not be excluded.

All of the Latin American countries for which information on marriage dissolution is available from the World Fertility Survey indicate a much higher percentage of first marriages were dissolved than was the case in Asia (except for Indonesia). In the few countries for which data are available, more than three quarters of first marriage dissolutions are due to separation. This is due to fairly low levels of mortality and divorce and to the high incidence of consensual unions among these marriages.

African countries for which fairly recent census tabulations on marital status by age are available generally have very low incidences of celibacy. This is true south of the Sahara as well as in North Africa, with never married females aged 45-49 frequently amounting to 2 per cent or less. Around 1970 many of these countries showed singulate mean ages at marriage in the range 18-20 among females, with males marrying several years later. There is also evidence of an advancement in the age at marriage in Morocco and Tunisia.

During the 1970's, the annual number of legally contracted marriages per 1,000 of population steadily declined in most of the Western developed countries. A notable exception is the United States where the slightly higher rates recorded in the late 1960's persisted. These crude marriage rates were fairly stable in Eastern Europe, except for a slightly increasing trend in Romania and the German Democratic Republic. It is to be noted, however, that these trends may have been influenced by changes in population composition or, by high and rising re-marriage rates which may have concealed a decline in first marriage rates. In most Western countries for which post 1970 data are available first marriage rates (per 1,000 persons aged 15 and over) have declined during the 1970's, though data for Hungary and the German Democratic Republic show an increase in this rate.

With some significant exceptions, female age at first marriage in developed countries is higher than in developing countries. Around 1970, the singulate mean age at marriage varied from about 21 years in most Eastern European countries to 25.7 in Sweden, with most countries closer to the lower limit of this range. Censuses taken around 1970 and in later years show that in 13 Western developed countries the proportion of women aged 20-24 who were never married ranged between one half and three quarters and, with only a very few exceptions the proportion in all of these countries exceeded 40. It is to be noted, on the other hand, that considerably lower proportions (24 to 37 per cent) were recorded in East European countries, the only exception being Poland (47 per cent).

For almost all the developed countries for which post 1970 data are available, there are clear indications of a postponement of formal marriages and a reversal of along standing declining trend in the age of marriage. Thus the female median age at first marriage has been increasing consistently, and the censuses taken after 1970 show an increasing trend in the proportion of never married females in the 20-24 age group.

Important changes in attitudes towards formal marriage have been taking place in Western societies in recent years. The general pattern is that women are marrying at a later age, but legal marriage is being preceded by a period of cohabitation or consensual marriage, starting at ages even below those of entry into legal marriage only a few years ago. The practice of cohabitation raises the age at marriage - by an estimated period of two years in several countries. The causes of these changes, though still under scrutiny, include changes in the role and status of women in the society, easy access to a variety of efficient methods of birth control (which eliminates or substantially reduces the risk of having unwanted children within these consensual unions), and greatly increased acceptance not only of cohabitation but also of child-bearing outside legal marriage and hence a reduced necessity for marriage.

Mortality

The slow-down of mortality decline which was observed in the late 1960's in developing countries with reliable data, primarily Latin American countries, has raised concern about the feasibility of closing the gap between the developed and the developing countries in the near future and meeting international targets in this regard. The World Population Plan of Action has as one of its goals the attainment of a life expectancy of 74 years for the world as a whole by the end of the century. On the basis of the estimates and projections prepared by the Population Division, it now seems that this goal cannot be attained particularly in Africa and most of Asia. While life expectancy in the developed countries is expected to be above this level, the projections indicate that by the end of the century the developing countries as a whole may reach a life expectancy of 63 or 64 years - only a year or two above the level of 62 years which the Plan stipulated for the world in 1985.

It was commonly thought in the 1960's that socio-economic progress was not essential for bringing about mortality decline in developing countries and that substantial and rapid progress could be made through introduction of modern public health measures. Since then, however, it was realized that both development and public health factors are involved. Investigations carried out in the mid-1970's have shown that combating the group of causes consisting of influenza, pneumonia and bronchitis accounts for perhaps a third of the mortality decline. Since effective preventive measures have not been deployed against these diseases to any significant degree, changes in living standards seem to be mainly responsible for the reduction in mortality arising from these diseases. It also seems that economic development factors in the form of relatively costly improvements in water supply and sewerage, are mainly responsible for the decline in diarrheal diseases, which amounts to about one-tenth of the total decline. On the other hand, about one-half of the decline, brought about by combating such communicable diseases as malaria, tuberculosis, smallpox, measles and whooping cough, was due to public health programmes applying new inexpensive technology: vector control and immunization.

Likewise, it seems that both living standards and the availability of public health measures and medical facilities are responsible for differences in mortality between urban and rural areas, and between population classes within such areas. Marked differentials are usually observed according to educational and occupational status, but these variables are interrelated with living standards and better knowledge of sanitary and personal health measures. Unfortunately, lack of information has been a main obstacle to research aiming at quantitative assessment of the impact of the numerous intricately related factors involved.

In a recent study of mortality trends since 1950 in 23 developing countries for which reasonably reliable data are available (14 in Latin America, 6 in Asia and 3 in Africa) it was observed that in nearly all of these countries infant mortality has been steadily declining and generally is declining faster now than before. Nevertheless, in about half of these countries there was a temporary slow-down in the rate of decline around 1965-70, and in three cases, all in Latin America, there was an increase. Similarly, where data were available, declines in adult mortality were generally observed, and in each of the seven countries in which available data allowed observation of a trend, a temporary slow-down in the rate of decline during the late 1960's or early 1970's was noticed. This temporary set back was then followed by a faster decline in more recent years. It is possible therefore, that a slowing of the pace of mortality decline was not uncommon during the late 1960's. However, the countries studied have already attained low levels of mortality and are generally more developed than other developing countries. Whether their trend of mortality decline is representative of the developing countries in general or whether their own state and pace of development has caused the faster mortality decline that is taking place at present remains an open question.

On the whole, it seems that mortality levels in Sub-Saharan Africa are still the highest in the world, with levels of life expectancy at birth well below 50 years, and that this area has made the least progress in lowering mortality during recent years. Exceptions are the small islands of Comoros, Mauritius and Reunion where impressive gains have been made. Mortality levels can be determined with greater certainty for North Africa where estimates of life expectancy, except for the Sudan, range between 55 and 60 years. Most of the South Asian countries belong to the range of

50-60 years. On the other hand, recent estimates of life expectancy in China exceed 65 years, and numerous small countries in Asia, have managed to bring mortality down to or near the levels prevalent in developed countries.

Among developing countries, mortality conditions are best documented in Latin America where the majority of the countries enjoy a life expectancy above 60 years. In several of these countries, the level is close to that prevalent in the developed world, and such large countries as Brazil and Mexico are not far from this level.

Infant and child mortality levels remain the most critical in the developing countries. In so far as can be ascertained from available data, infant mortality rates for virtually all of Sub-Saharan Africa are in the range of 150-200 deaths per 1000 live births, and in North Africa the rates generally exceed 100. In the large nations of South Asia the rates appear to remain well above 120. In Latin America the rates are in general considerably below 100. The significance of these levels can be appreciated by comparing them with those of developed countries, which are now mostly in the 7-15 range, and with those of Hong Kong and Singapore, which have already reached the 12-13 level. Though figures on child mortality (1-4 years of age) are difficult to find in several regions, available estimates range between 4 and 40 per thousand, while in the developed countries these rates are one per thousand or less.

As in the case of fertility, mortality differences are observed, and usually found to be much more pronounced than in developed countries, when population is stratified by such conventional socio-economic factors as place of residence and education. Unlike the developed countries where urban-rural differences have tended to disappear, rural communities in the developing countries have a much higher mortality than urban areas, with the difference reaching 50 per cent or more of the urban level. Such a difference clearly reflects in part, better sanitation and access to medical service.

There is extensive evidence indicating that maternal education plays a major role in influencing infant and child mortality, presumably reflecting personal health behaviour, care and access to and use of medical facilities. It was found in Latin America, for instance, that the probability of death between birth and age two years declined almost linearly with increase in the level of mother's education. Children of illiterate women had a risk 3.5 times that of children whose mothers had 10 or more years of education. It was also found that the influence of mother's education was still pronounced even after taking into account the effect of the place of residence.

Though the decline of mortality in the developed regions was quite slow in the decade of the 1960's, it gained momentum in the 1970's. Around the middle of that decade, several countries in Northern and Western Europe had already achieved a life expectancy at birth of 78 years among their females and an infant mortality rate of 10 or less. In the early 1970's, the life expectancy of females in the developed regions ranged from 70 to 78 years, and for males it ranged from 64 to 72 years.

As to over-all sex differences in mortality, the greater life expectancy among females is well established, averaging about six years and reaching ten years in the USSR (1970-71).

The gain in life expectancy which the developed countries made during the third quarter of this century was about seven years (six among males and eight among females), or about 0.3 years annually on the average, an accomplishment that has to be assessed in light of the fact that the main causes of death are no longer those that can be addressed through public health measures. It is well known that significant progress can be made in combating only endogenous diseases which mainly afflict persons aged 50 and above. The total elimination of mortality below age 50 would add only two or three years to life expectancy among females and four or five years among males.

Due to control of infectious diseases which are now responsible for only one per cent of all deaths, circulatory diseases have become the main cause of death among males above the age of 35 or 40, followed by cancer among persons above age 40. Among females aged 20-60 the main cause of death has become cancer, and circulatory diseases are the main cause of death among those above the age of 60. However, during the 1970's the trend in 20 out of 28 countries for which data are available has been towards a decline in circulatory diseases among females and to a lesser degree among males. An increase was observed in the incidence of cancer among males above age 45 as well as among young females.

Inter-country differences in mortality have been narrowing for a long time. While around 1950 the range of difference in life expectancy among the developed countries was about 19 years, this range was only 8 or 9 years around 1975. The same cannot be said, however, about intra-country differences. The upper social classes are benefitting more from the progress achieved in reducing mortality, due in large part to changes in life-style, including nutrition and exercise.

Age structure

Declining fertility in the developing countries has caused a corresponding decline in the proportion of the child and young population (aged 0-14) from 42 per cent in 1970 to an estimated 39 per cent at present. In fact the annual rate of growth of this group, which was 2.5 per cent in the 1960's, has declined to 1.6 in the 1970's. Due to the expected continuation of fertility decline, this proportion is estimated to be 34 per cent by the year 2000, according to the medium variant projection. Although the latter percentage, constitutes a substantial decline from the 1970 level of 42 per cent, it would still be far from the 23 per cent which currently exists in the developed countries.

Judging from current and anticipated fertility and mortality trends, the aging of population, already a demographic problem for many years in the developed countries, may become a problem in China and other developing countries experiencing rapid fertility decline. Thus in all developing countries, the population aged 65 and over, now only 4 per cent of their total population, was increasing at a rate of 2.7 per cent in the 1970's (compared to 2.3 in the developed countries) and this rate will continue to increase, leading to a substantial increase in the proportion of the population 65 and over. It is expected to be about 25 per cent by the year 2000. The old age component in developing countries, with its social and health problems, is not expected to be a significant factor in the less developed countries except where fertility is declining rapidly, notably China. In the developed countries the old age percentage among the population is 11 at present and is expected to increase to 13 in the next two decades.

It should be emphasized that the demographic situation in China has had a substantial impact on the above mentioned measures for the developing countries. In the rest of the developing world the 0-14 and the 65 and over groups would be 37.2 and 3.8 per cent of the total population, respectively at the end of the century. With respect to the developed countries, the proportion of their total population aged 0-14 declined during the past two decades until it reached the present 23 per cent level. In the next two decades, the population in this age group is projected to grow at a rate not exceeding 0.3 per cent per annum and to constitute 21.5 per cent of the population of these countries in the year 2000. On the other hand, the aging process is expected to continue in these countries, with the percentage aged 65 and above increasing from 11 at present to 13 at the turn of the century.

Recent demographic trends are also reflected in the continually increasing median age of populations in the developed countries, rising from 28 years in 1950 to 31 at present and to an estimated 36 years in the year 2000. In the developing countries this median age declined from 21 years to 19 between 1950 and 1970 and then reversed its direction, reaching 20 years now and a projected 23 years at the end of the century. Thus the gap in median age between developing and developed countries has been continuously increasing, from 7 years in 1950 to an estimated 13 years in 2000. As may be expected, current differences in median age among countries are quite substantial, with medians ranging from 16 years in some West African countries to 36 or 37 years in some European countries.

Dependency ratios, namely those relating either the child population (0-14) or the old-aged population (65 and over) to the population in the ages of economic activity (15-64), obviously reflect these trends. In the developing countries the number of children per 1,000 adults in the ages of economic activity was 76 in 1970, compared to only 44 in the developed countries. The trend in this child dependency ratio has been declining recently, reflecting mainly declining fertility in both developing and developed countries. The ratio is estimated at 69 in 1980 in the developing countries and is expected to reach 56 in the year 2000, while in the developed countries the ratio is expected to decline very slowly from 35 at present (half the value in developing countries) to 33 at the end of the century. On the other hand, old-age dependency as a population problem in the developed countries has been intensifying for several decades. The number of aged per 100 adults of working age which was 12 in 1950, is about 17 now and is expected to reach 20 in the year 2000. In the developing countries as a whole, the ratio which was stable and equal to about 7 is expected to show a modest increase to 8 at century's end.

International migration

A major change in the pattern of international migration during the last decade was the emergence and expansion of flows of migrants to the resource rich developing countries particularly those of Western Asia. At the same time the large scale flows into Northern and Western Europe were substantially reduced, and the South-to-North flow, which was the predominant pattern of international migration in the decade of the 1960's and the early part of the 1970's continued between Latin and Northern America.

The decade and a half ending in 1975 witnessed flows, mainly of males, going from poorer to richer countries in search of employment. During that time the traditional countries of immigration of North America and Oceania continued to receive large flows.

A very important factor influencing the global pattern of international migration in these years was the pace of economic growth and a rising demand for labour in Northern and Western Europe. In addition to providing increased opportunities for employment for resident citizens, hence reducing their propensity to emigrate this growth attracted increasing numbers of migrants from outside Europe. In the decade of the 1960s the net migration balance for Europe as a whole was nearly zero, although gross flows were substantial. During the first half of the 1970s, Europe as a whole had a net inflow of just over 900,000.

Within Europe, the leading countries of immigation were the Federal Republic of Germany and France, however, almost all of the other countries of Northern and Western Europe experienced relatively large net inflows.

A very substantial proportion of the migrants to Northern and Western Europe came from Southern Europe. In all, there was a net outflow of about five million during the 1960s and early 1970s; Turkey also became a major supplier of labour to Western Europe. The demographic impact of the outflow was especially heavy for Portugal, whose total population experienced an absolute decline in the 1960's and early 1970's.

After being a region of net immigration, Latin America since around 1960 became a region of substantial net emigration due to a reduced inflow from South Europe and an increased emigration to the United States. There was also a substantial flow from the English speaking countries of the Caribbean to Canada and the United Kingdom. Immigration into Canada from Latin America, mostly from the Caribbean, rose steeply during the late 1960's and the early 1970's. Within Latin America, Argentina and Venezuela began to attract larger numbers from neighbouring countries.

In Africa too, labour migration grew in importance. The countries along the coast of West Africa have traditionally attracted migrant workers from the landlocked countries to their north. In Southern Africa, employment of migrant labour is a highly organized practice. However, South Africa has recently followed a policy aimed at reducing its dependence on immigrant labour. By 1977 the number had declined to 360,000.

Since 1970, a large stock of migrant workers has been building up in the resource-rich Arab countries. While data for this region are markedly uneven in quality, it appears that in 1970 more than one million foreigners were employed, most of whom were drawn from other Arab countries, and the number had risen to nearly two million by 1975. These flows have had a significant demographic impact because, apart from Saudi Arabia, the national populations are small in comparison with the number of immigrants.

While economic stringency in Europe and the other industrial countries brought an end to the expansion of the stocks of migrant workers in these countries, flows into the Middle Eastern and other oil exporting countries continued to increase in importance, and their number doubled between 1970 and 1975. Large proportions of the migrant workers have continued to come from other countries within the region, but there is also a growing dependence on workers recruited from Southern and Eastern Asia. All available evidence indicates that the growth has continued until the present, although possibly at a somewhat diminished rate.

The large flows of migrants are also generating large new flows of remittances. For example, Pakistan reported a net inflow of about $1,300 million. Moreover, the remittance flows have been growing very rapidly. In several countries the flows approximately doubled from 1975 to 1976 and then doubled again from 1976 to 1977 (at current prices).

While the stocks of immigrants in the European countries continue to be substantial, changes since the mid-1970's reflect less the effects of entry of new migrant workers and more the results of family reunification and natural increase. To a considerable degree, the second half of the 1970's can be characterized as a period of relative stabilization in international migration for Europe, following the preceding decade and a half when stocks and flows were building up steadily. During the second half of the 1970s, outflows of the leading countries of net immigration tended to decline from levels attained around 1975 and by the late 1970s were generally comparatively close to the inflows.

Temporary labour migration has given rise to some controversy at the international level. It has economic benefits for sending countries in terms of substantial remittances and, in many instances, reduction of unemployment. It alleviates labour shortages in the receiving countries. On the other hand, this migration entailed the loss of needed skilled workers in some key occupations in countries of origin. Furthermore, European countries have encountered problems arising from friction between foreign and national labour, and problems in returning foreign workers to the countries of origin upon termination of temporary employment. In some small countries with relatively large stocks of migrant workers, as in some Middle Eastern countries, there is concern about the political impact of foreigners who have remained for long periods without being assimilated. Along with the movement of workers with comparatively limited skills from developing to developed countries, there was the small but significant flow of highly trained persons, the so-called brain drain, estimated between 300 and 400 thousand between 1960 and 1975.

Another important and apparently increasing international flow is that of undocumented or illegal migrants. Such flows are naturally difficult to estimate, but they are known to have reached substantial numbers in the United States, Europe, Venezuela and some Middle Eastern countries. Control of this type of migration has become a policy issue of serious concern to the countries involved.

Outbreaks of repatriation flows and refugee movements continued during the last decade. The United Nations High Commissioner for Refugees and United Nations Relief and Works Agency reported that as of early 1980, there were about 10.5 million refugees and displaced persons. In South-East Asia, over a million persons had fled their country from 1978 onwards. The size and suddenness of the flows have imposed severe strains on receiving countries. Altogether in Africa there are estimated to be over 3 million refugees of which the largest numbers are found in Sub-Saharan Africa.

Urbanization

A recent revision of the estimates and projections of urban and rural populations prepared by the Population Division gave very similar results to those provided in the second round of monitoring. In summary, urbanization is expanding rapidly in the developing areas, due to rapid natural increase, internal migration and territorial redefinition, and is leading to the emergence of human agglomerations of unprecedented magnitude. By the end of this century, it is projected that slightly over half the world's population will be living in urban areas, slightly over half the urban population will be living in cities having half a million or more inhabitants, and more than two-fifths of the urban population will be in cities of four million or more inhabitants.

Growing at a rate of almost 4 per cent annually since 1960, the urban population of the developing countries is already in excess of one billion, or a little over 30 per cent of the total population of these countries. Thus during the three decades starting in 1950, the urban sector of these countries increased 3.6 times and the degree of urbanization has almost doubled. The projections anticipate a gradual decline in this rate of urban growth, to 3.5 per cent at the end of the century. The trend implies a doubling of the urban population in the remaining two decades and an increase in the degree of urbanization to 44 per cent.

In the developed countries, on the other hand, the rate of urban growth has declined, from 2.4 in 1950 to 1.4 at present and is expected to decline to a little under one per cent in the year 2000. Accordingly, their urban population, estimated at 800 million at present, is expected to increase by about 25 per cent to one billion at the turn of the century. These countries, which are now about 70 per cent urban would thus become 80 per cent urban in 2000, raising the degree of urbanization in the world as a whole from about 40 per cent at present to slightly over 50 per cent in that year.

Despite the very high rate of urban growth in the developing areas, their rural populations are still increasing at substantial rates, averaging about 1.4 annually at present. The anticipated decline in natural increase combined with rural-urban migration could bring this rate down to 0.6 by the end of the next two decades. However, during this period the rural population would increase by 500 million or 22 per cent. This increase is taking place while the rural population of the developed countries is declining at an average rate of 1.1 or 1.2 during the same two decades, thus experiencing a net decline of 20 per cent over the period. The developing regions show considerable heterogeneity in this respect. Rural growth in East Asia is expected to terminate by the end of the present decade. In Latin America, which is already 63 per cent urban, the rural population is expected to continue increasing at a rate of about 0.75, which is considerably lower than the corresponding rate in Africa and South Asia.

Urbanization, particularly in the developing countries, is oriented to large cities and the prospects indicate a continuation of this trend. As recently as 1970 there were 24 cities of four million inhabitants or more. This number has since increased to 38 and is expected to exceed 80, within the next two decades. This phenomenon is taking place mainly in the developing countries which had only 12 such cities in 1970, have 23 at present and are expected to have over 60 in 2000. If the projections are approximately right, a full quarter of the urban population of the developing countries would then be living in cities of 4 million and more. (The corresponding proportion is now 18 per cent in the developed countries).

Cities of between one million and four million persons, though increasing substantially in numbers, show very little increase in their share of the urban population, both in the developing and the developed countries, and their share of the world's urban population, estimated at 18 per cent in 1970 would probably become 20 per cent in 2000. Similarly little change is observed in the proportion living in cities of between 500,000 and one million persons. It is thus at the expense of towns with population below half a million that large scale urbanization is materializing in both the developing and developed countries. The share of these towns in the urban population of the world has declined from 58 per cent in 1970 to 54 at present and is expected to decline to 49 in 2000.

Another phenomenon of modern urbanization is the emergence of the very large or mega-city, a large agglomeration which may contain a number of urban centres, each with its own administrative boundaries. In 1950 there were two such agglomerations, with 10 million inhabitants each, namely metropolitan New York and London. At present there are 10 such mega-cities, of which the largest is metropolitan New York which has about 20 million inhabitants. Six of these mega-cities are in the developing countries (compared to none in 1950). The projections indicate that there could be 25 such mega-cities by the end of the century, most of which would be in the developing countries, and several of which may exceed 20 million inhabitants. However, physical, economic and technological constraints may impose limitations on the future sizes of these agglomerations.

Urban concentrations in the developing world already pose increasingly serious problems. In the majority of countries the situation is producing a geographical distribution of the population which far from optimal for the full utilization of resources and the full integration of the population in economic, social and political affairs and there are strong indications that the geographic distribution of the population will pose an even greater challenge that Governments will have to face in the future.

POPULATION AND DEVELOPMENT

Relations between fertility, mortality and socio-economic variables in developing countries

Planners have given increasing consideration to ways in which socio-economic policy variables can influence levels of fertility and mortality. Conceptual analysis suggests that these variables are linked by an intricate network of extremely complex interrelationships. In part because of this complexity and in part because of inadequate data it has not been possible to fully sort out the direct and indirect demographic effects of alternative socio-economic policies.

Full scale national studies have been impeded by the absence of the necessary observations for many developing countries. As a preliminary step, a study was undertaken by the United Nations Population Division which examined the relationship between fertility, mortality and selected socio-economic variables using simple regression analysis. Although 85 developing countries were considered, the requisite data was available for only 21 countries.

Though selected on the basis of data availability, the 21 nations are to some degree geographically representative, however, they are considerably more developed than the majority of developing countries. Though the results of this study may not apply to developing countries generally, they do point to some promising areas for future investigation.

Linear regression models were estimated for indicators of fertility and mortality using as arguments seven socio-economic variables, selected on the basis of a preliminary correlation analysis. The independent variables included two educational indicators, two indicators of the status of women, Gross Domestic Product (GDP) per capita, the share of income going to the poorest 40 per cent of the population and the proportion of the population which is urban.

When all seven independent variables were included in the model 79 per cent of the variance in the CBR and 71 per cent of the variance in the GRR were explained. Due to the high inter-correlation among the explanatory variables, it was possible to find six groups of three independent variables which explained more than 70 per cent of the variance and no single variable was essential for explaining a high proportion of the variance, except the share of income going to the poorer 40 per cent of the population.

Only one indicator of mortality was considered, life expectancy at birth. When all seven independent variables were included, 86 per cent of the variance in life expectancy was explained. However neither *per capita* GDP nor the share of income going to the poorest 40 per cent played a significant role in the mortality equations.

Though the results of this study are merely indicative, when comparable data for the majority of developing countries becomes available, it should be useful to investigate whether *per capita* GDP and the distribution of income are more significant as determinants of fertility than as determinants of mortality. If this should prove to be the case, it would then be useful to try to identify the specific causal links that explain this phenomenon.

Health, Population and Development

It has become increasingly evident that health is not only a desirable goal in itself but also a means and indeed an indispensable component of social and economic development. Conversely, the attainment of health targets depends on economic and social progress, the achievement of greater equity, improvements in the environment, the availability of an adequate food supply and the implementation of appropriate population policies.

The world health situation leaves much to be desired. About 800 million people in the developing world have incomes too low to ensure basic nutrition and have little access to essential health services. There has also been a significant increase or resurgence of certain communicable diseases in these countries, while in a number of industrialized countries rapid increases in health costs have called into question the relationship between health care and health indices. In the developing countries the search for alternative approaches has led to the view that primary health care is the most important means whereby the health sector can improve the health status of the population.

Among the most important interactions between health and development, are those where population growth and change are intermediate variables. For example, the age distribution of the population is due to past trends in fertility and mortality which are in turn linked to trends in health status. Conversely, a changing age distribution can bring about a radical change in the demand for health services.

Family planning is one of the important operational elements in programmes to reduce rates of population growth. These programmes can also favourably influence health by reducing unwanted pregnancies; reducing the total number of children born to a mother; changing the time in a mother's life when births occur and achieving an optimal interval between pregnancies. Conversely family health programmes can contribute to the success of family planning programmes since a sharp decrease in early childhood mortality rates is often considered a pre-requisite for lowering fertility rates.

It has become increasingly clear that activities in all development sectors, are essential to the improvement of health. In this regard life expectancy at birth is an extremely useful measure of the level of health of a population when viewed from the broader perspective of socio-economic development strategy. At present there is a gap in life expectancy at birth between the developed and developing countries of the order of 15 to 18 years. Provided that satisfactory progress is made in those social, economic and political areas that influence mortality, this gap should be cut in half by the end of this century.

Causes and Consequences of Internal Migration in Developing Countries

Rural-urban migration has long been considered an essential component of the modernization process. Many theories of the development process focus on the need to shift labour from the lower productivity agricultural sectors to higher productivity industrial sectors arguing that urbanization is a necessary complement to the process of industrialization. However, the view is now widely held that current rates of rural-urban migration are excessive.

In general the reasons for migrating can be traced to differences between rural and urban living standards. The low level of *per capita* income in rural areas can be attributed to rapid population growth, an unequal distribution of land ownership and the structure of capital and labour markets. Often national policies tend to widen the gap in socio-economic conditions between rural and urban areas. In particular policies of plant location, import substitution, public investment, minimum wages and the differential provision of health, education and recreational facilities favours urban areas.

All of these factors provide an insight into the policy options open if governments wish to moderate the flow but it is necessary to explore the consequences of rural-urban migration in order to decide whether or not it would be appropriate to interfere with this process.

The consequences of the movement to the cities can be viewed from three perspectives, that of the migrant, the rural areas and the urban areas. Of these the effects on the migrants are most certain. In general they are beneficial. Migrants generally find employment, improve their living standards and even earn a surplus which they can then remit to their families in the areas of origin.

The consequences of out-migration from the viewpoint of the rural areas are more ambiguous. To be sure, they benefit to some degree from remittances and there is an increase in the land to labour ratio. Furthermore rural areas may benefit from an increase in the price of agricultural commodities relative to industrial output. However, the increase in agricultural wages due to migration may result in a shift toward capital intensive agricultural techniques. This may cause a further concentration in the distribution of agricultural income and land holdings.

Empirical studies with regard to the effect of migration on rural areas are inconclusive. It is not clear whether remittances are used productively. Studies indicate that though internal migration may reduce the differential between rural and urban incomes, it may widen the disparities within the rural sector. The evidence currently available does not support the contention that rural-urban migration increases the demand for agricultural output relative to industrial output thus improving the rural terms of trade. At present there are no analytic studies to confirm the hypothesis that migration encourages the introduction of labour saving technology in agriculture. Overall it can be said that the question of whether rural-urban migration is beneficial or harmful to rural development has yet to be resolved.

The rapid movement of persons in developing countries from rural areas has had both economic and demographic consequences. Of the two, the economic effects are the more difficult to disentangle.

It has been widely hypothesized that urbanization has outpaced industrialization in much of the developing world and therefore migration is a major cause of urban unemployment. However, empirical studies indicate that recent migrants have lower rates of unemployment than do other urban residents. Furthermore there is reason to believe that migrants may raise the overall level of urban employment.

Migrants from rural areas may lower urban wage rates leading to an expansion of employment. This may encourage industrial investment, particularly in labour intensive technology. By localizing the labour force urbanization may result in greater specialization and other economies of large scale production. Ultimately the net impact of migration on urban areas will depend upon the characteristics of the migrants themselves. If the migrants are in the prime working ages and bring with them useful skills, they will benefit the areas of destination.

The demographic effects of migration on urban areas are more definite. Although migrants tend to have higher fertility than the general urban populace, their fertility is lower than comparable persons who remain in the rural areas. For that reason increasing migration and urbanization are likely to reduce the fertility level in the nation as a whole.

Given the documented benefit of rural to urban movement to the migrants themselves, given the ambiguity with respect to the overall economic impact with regard to rural and urban areas generally and given to role played by urbanization in moderating rates of fertility, it would seem that the value of policies designed to curb migration remains open to question.

Determinants of labour force participation

The size of the labour force is a reflection of the size and age-sex composition of the population and the proportions of the various groups who are economically active. Thus an understanding of levels and trends in the size of the labour force requires an identification of the principal socio-economic and demographic determinants of activity patterns.

In low income agrarian countries most people contribute to subsistance from an early age and as a result the extent of child labour force participation has generally been understated. Though child labour persists in many guises in many parts of the world, economic growth and the associated shift to higher levels of school enrollment and the formalization of work relationships has led to a decline in child labour force participation rates.

Most men above the age of 14 participate in the labour force except for those in school, those who have retired and some who have become discouraged from seeking employment. This participation rate though high, tends to decline logistically with economic growth and industrialization.

Though most men spend their adult years in the labour force, the situation is more complex in regard to women. In low income countries four patterns emerge: participation rates may be low in both urban areas and rural areas; they may be high in both areas; they may be high in rural areas and low in urban areas; or they may be low in rural areas and high in urban areas. Some observers have also detected a U shaped pattern in regard to industrialization with labour force participation of women declining initially and then rising as industrialization progresses. There are also a variety of age profiles of female labour force participation.

Among the socio-economic determinants of female activity rates is the industrial-occupational structure. The shift of wage labour in agriculture has tended to squeeze women out of farming; on the other hand, mechanization has opened up opportunities for women in a wide variety of industries and occupations. Another major determinant of women's economic activity is the level of aggregate demand since in periods of declining employment women tend to be pushed to the margin of the work force.

In many low income countries women have been forced to enter the labour force to meet family income requirements. Thus with higher income families the need is reduced and in both industrialized and industrializing countries there is a tendency for women whose husbands have relatively high incomes to have a low propensity to participate in the labour force. On the other hand if wages improve for women or if income earning opportunities emerge their labour force participation will be greatly enhanced.

Though the causal process is not very clear, empirical studies tend to indicate a straight forward positive relationship between indices of education and the probability of labour force participation. But in some of these studies the effect is non linear or has only been observed beyond some threshhold level of schooling. Furthermore high levels of unemployment and persistant discrimination will greatly reduce the positive effect.

In addition to some economic factors, demographic factors such as fertility and migration also play a very important role in the labour force participation of women. It has long been hypothesized that there is a strong inverse relationship between fertility and female activity rates. This has strongly influenced policy prescriptions and has recently received further empirical support from comparative analyses of data from the World Fertility Survey. Studies indicate that this relationship is influenced by three factors: the size of the societal norm for family size; the existence of plentiful child labour and the availability of alternative child care arrangements. When the societal norm is large, young women will typically be excluded from most "career" jobs and even job training. When child labour is restricted, greater female labour force participation is allowed and the child-care constraint on female economic activity will vary inversely with the availability and cost of child-care arrangements. In general the linkage between fertility and labour force participation is most consistent in the industrialized countries.

Although evidence is sparse, studies indicate that the more educated women tended to have a higher participation rate than the less educated women for each level of fertility and that an increase in family size had a proportionally greater effect on participation at higher levels of schooling.

Migration affects the labour force participation in a variety of ways. The out migration of men from rural areas tends to increase female participation in agriculture and the migration of women will effect their own participation. Since most adult migration is for economic reasons, all migrants, including females, tend to have higher participation rates than non migrants. Furthermore population mobility can be expected to reallocate labour from areas where there are relatively few labour force opportunities to areas where more labour is required.

Demographic aspects of changes in consumption levels and patterns

The relative magnitudes of expenditures devoted to food and non-fodd items are major determinants of the sectoral pattern of employment, the structure of prices and the distribution of income. For this reason the estimation of future consumption patterns is a major element in the development planning process. Normally these estimates are derived from Engel elasticities which relate the consumption of particular commodities to total income or total expenditures. However Engel analysis in its simplest form neglects the influence of important demographic factors and therefore may yield incorrect results.

A study undertaken by the United Nations Population Division refined a methodology which may be applied to assess the impact of demographic factors on the pattern of consumption. It involves the integration of microanalytic consumption functions into a macro-economic framework.

1. The effect of demographic factors on household consumption expenditures

In the first phase of this study household [3] consumption functions were estimated from household survey data of Pakistan (1971-72) and the Philippines (1971). For each nation separate functions were estimated for rural and urban areas and for food and non-food items. In each case the level of household consumption expenditures on a given commodity was made a function of total household expenditure and the number of household members, disaggregated by age. The size and sign of numerical coefficients were as expected. In both the rural and the urban areas the proportion of each additional increment of total expenditure going to food items was substantially less than that going to non-food items.

The proportion of additional expenditures going to specific commodities also varied between rural and urban areas. The proportion going to non-food items was more than 10 per cent greater in urban than in rural areas. This is also to be expected given the higher level of expenditure per household in urban areas.

In both rural and urban areas, increases in family size were associated with a shift in expenditures from non-food to food items. Since total household expenditures are larger in urban areas, the shift due to an increase in family size was larger in those areas. The shift was most pronounced if the additional family member was an adult.

2. Decomposition of the aggregate increment in consumption

Increments of aggregate consumption expenditures can be decomposed into four additive independent elements. For purposes of discussion these effects may be referred to as the effects due to changes in : (a) the number of households; (b) average household size; (c) rural to urban migration and (d) per household expenditure. To demonstrate this technique, simulations of aggregate consumption expenditures covering a five year period were prepared for Pakistan and the Philippines.

The micro coefficients of the household consumption functions that had been computed in the first part of the analysis were substituted for the macro coefficients in a model of aggregate consumption developed by

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[3] The household was used as the unit of analysis in one case and the family was used as the unit of analysis in the other. For purposes of exposition the term household will be used in describing both studies.

Allen C. Kelley [4] along with hypothetical values for the changes in expenditures per household, the number of households, household size and the rate of rural-urban migration.

On the basis of these simulations it was projected that over a five year period total consumption would increase by the equivalent of $ 1,113 million in Pakistan and by the equivalent of $ 1,322 million in the Philippines. Of these totals nothing was attributed to changes in average household size. In both countries 62 per cent was attributed to the change in the number of households. In Pakistan 2 per cent was attributed to rural-urban migration and 36 per cent to the change in expenditure per household. In the Philippines 9 per cent was attributed to rural-urban migration and 29 per cent to the increase in expenditures per household.

This means that in the absence of changes in the number of households, the location of households and expenditure per household, changes in household size would have had no effect on total consumption expenditures. Were household size, rural-urban location and expenditure per household to remain constant and the number of households to increase at the assumed rate, then total expenditures would increase in both countries by an amount equal to 62 per cent of the total increase in consumption expenditures.

If household size, the number of households and expenditure per household in both rural and urban areas were held constant, a shift in the distribution of households from rural to urban areas would result in a small increase in consumer expenditures for food and a somewhat larger increase in the case of non-food expenditures. Finally if all demographic variables were assumed to be constant and per capita income were to increase as hypothesized, the result would be an increase in consumption expenditure equal to 36 per cent of the total increase in the case of Pakistan and 29 per cent of the total increase in the case of the Philippines.

Though changes in total expenditures per household were associated with less than 40 per cent of the increment in total consumption expenditure, it would be incorrect to conclude that demographic variables are more important than economic variables in determining levels and patterns of household consumption. This decomposition assumed that household size, the number of households, their geographic location and expenditures per household can be treated as independent factors. In reality they are mutually interacting factors. In order to form a complete view of the consequences of demographic change on consumption, these interrelationships between the economic and demographic determinants would also have to be assessed. However this exercise has demonstrated that population factors are important in explaining shifts in the composition of consumption expenditures and that in future planners should give greater weight to the consequences of demographic change in projecting future consumption levels and patterns.

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[4] Allen C. Kelley, "Demand Patterns, Demographic Change and Economic Growth", The Quarterly Journal of Economics, Vol. LXXXIII, No. 1, February 1969, pp. 110-126.

Demographic Characteristics of Women's Work

There is an important relationship between a women's current work status and some of her demographic characteristics including age, current marital status and the age of her youngest living child. In addition, local economic and employment conditions will have an independent effect on the relationship between work and fertility.

Data on women's work histories are available from the World Fertility Survey relating to seven Asian countries, Bangladesh, Indonesia, Jordan, Korea, Pakistan, Sri Lanka, Thailand, and three Latin American countries, Colombia, Panama and Peru. Despite wide variations in work rates across countries and certain definitional difficulties, three patterns emerge from these data. The first is displayed in the Latin American countries where a substantial proportion of women had worked at some time before or after marriage and the timing of work is flexible. The second is displayed by the Moslem countries of Bangladesh, Pakistan and Jordan where relatively few women are recorded as working under any circumstances. In Jordan there appears to be more flexibility in the timing of work for the relatively few women who work whereas in Bangladesh and Pakistan, working women, who are few in number, appear to work consistently and are therefore likely to be quite unusual in many respects relative to the average women. In the rest of the Asian countries represented, work experience is reasonably high and there is less flexibility, although Korea and Sri Lanka appear to represent a somewhat intermediate group.

In most countries, current work rates are seen to rise with age, though more sharply in some countries than others. However, in the three Moslem countries (Pakistan, Bangladesh and Jordan) few women work at any age. In general, the data suggest that current work rates are related to the age of the youngest living child in that current work rates are higher for women whose youngest child is older. In addition, however, the distribution of women's employment in terms of occupation, industry and location of work is an important determinant of the shape of the age-work relationship. Although there are some notable exceptions, it is usually the case that working away from home, in non-agriculture and as a non-family employee are associated with fewer children ever born because in such cases work and child rearing are more difficult to reconcile.

Potential Population Supporting Capacities of Land ; Africa

Despite major advances in agricultural technology, hunger continues to affect at least 500 million people. Projections indicate that almost 50 per cent more food must be grown in the year 2000 to maintain present inadequate nutritional levels and additional supplies would be needed to conquer famine and malnutrition. However the ability of land to produce food is limited by soil and climatic conditions as well as the nature of the crop and technology employed. Accordingly there are critical levels of populations that can be fed from any specific land area. Once the upper level of technology has been reached, any attempts to increase food production in excess of these critical levels can only result in degradation of the land, hunger and eventual reduction in population.

The FAO and UNFPA in collaboration with the International Institute for Applied Systems Analysis has initiated a project to quantify the limits of the food producing capacity of lands. The present study describes the methodology used and presents results for the continent of Africa.

Basic to this assessment is a soil and climatic inventory. First deductions are made for land required for non-agricultural use, for irrigation and for fallow periods. Then major climate/crop temperature requirement rules are applied to ascertain which crops can be grown, after which the calorie-protein production from different crops is calculated. Once the maximum production potential for each zone is ascertained, country specific data on calorie-protein requirements per capita are used to determine the population supporting capacity according to the level of input envisaged. This data is compared with present population size to identify critical zones where potential sustained production is insufficient to meet the food needs of populations already living in those areas. Country population projections for the year 2000 are also compared with potential population densities to determine where future populations are likely to face critical situations with regard to food.

Generations of traditional subsistence cultivation have, to a large extent, determined the dietary preferences of populations. Accordingly, account has been taken of the mixture of presently grown crops and the relative proportions of their areas under cultivation. For the low level of input analysis, the pattern of presently grown crops is rigidly maintained even though those crops may be inferior in terms of calorie-protein productivity. At the intermediate level of input the present patterns is applied only to currently cultivated areas. The analysis at high levels of inputs assumes that all cultivable land is devoted to crops giving the highest calorie-protein production. Optimization of calorie-protein production is reiterative for each zone until both the calorie-protein constraint and the applicable present crop mix constraint are met. Accordingly, the analysis does not assume a transfer of produce from one zone to another.

The potential population supporting capacities for each zone are totalled at the country level to arrive at country potentials which are then compared with present population data and the United Nations medium variant population projection for the year 2000. This procedure permits the identification of countries where land resources are insufficient to supply the food needs of present or projected populations.

Computations have been made for each zone of each developing country in Africa. They show that the continent as a whole has sufficient rainfed cultivable land for self sufficiency. Given only a low level of inputs, the combined potential productivity from all 51 countries could feed 50 per cent more people than are projected for the year 2000. At an intermediate input level of technology, the land could provide for more than 5 times the estimated population.

However this would require a massive movement of food or population between and within countries because there are extreme differences in land resources at the zone and country level. It is estimated that the rainfed land resources of 13 African countries will be insufficient to provide for the food needs of their populations in the year 2000. In areas where the situation is not also critical at the high level of input, additional production needs can be met by changing the crop mix and raising the input level. The economics of this and of major land improvements however require careful investigation.

Economic disparities associated with socio-demographic development

In both the developed and the developing countries of the world, *per capita* gross domestic product (GDP) continues to grow, implying that production is increasing more rapidly than population. However rates of progress have been unequal with the result that disparities in levels of living have widened. In general, population continues to grow most rapidly in those countries which have the lowest levels of product *per capita* with the unfortunate result that the degree of inequality between nations has been magnified.

The progress of 114 nations and two sub-national entities, comprising more than ninety-seven per cent of the world's population in 1975 was studied in relation to socio-demographic change. It was found that the eighty-two developing countries with 72 per cent of total population, accounted for only 20 per cent of total production. The *per capita* GDP in these countries was equal to $ 270, measured in 1970 prices. In marked contrast the 34 economically more developed countries (MDCs), with 28 per cent of total population, accounted for 80 per cent of total GDP.

Although *per capita* GDP is an imperfect measure of welfare, it is distributed in a way that closely parallels other measures. For example, in 1975 *per capita* commercial energy consumption in developed economies was more than ten times that in developing countries. Differentials in *per capita* GDP also correspond to differentials in education and health indicators. Thus in 1975 secondary school enrollments equalled 82 per cent of the eligible population in developed market economies and 68 per cent in centrally planned economies. The corresponding figure for the developing countries was 28 per cent. Conversely there were more than ten times as many persons per physician and per nurse in the developing countries than in the developed economies.

When broad aggregates are considered, there appears to be a consistent association between per capita GDP and important demographic indicators. In 1975 the developed market economies, which had the highest level of GDP *per capita*, had the lowest rate of natural increase, the lowest total fertility rate and the highest life expectancy at birth. The developing countries which have the lowest GDP *per capita*, also had the highest rate of natural increase, the highest total fertility rate (TFR) and the lowest life expectancy at birth. The centrally planned economies which were in an intermediate position with respect to GDP *per capita* and most other welfare indicators were also in an intermediate position with respect to the demographic indicators.

There are also significant differences among the developing countries; among the most striking are the differences between the 12 developing countries which are oil exporters and the other 70 countries which are not. In 1975 the per capita GDP of the former was almost 80 per cent greater than that of the latter. The demographic characteristics of the oil exporting countries also differed markedly from the other developing countries at similar levels of per capita GDP. The oil exporting nations on the average had higher fertility, a higher rate of natural increase, a lower expectancy of life at birth and a smaller proportion of their population in the working ages (15 to 64) than in other developing countries.

There are also important regional differences among developing countries. In 1975 per capita GDP and per capita commercial energy consumption in Latin America were more than twice that of the developing countries as a whole, On the other hand the proportion of eligible persons enrolled in secondary school in East Asia was more than twice that of all developing countries. Both Latin America and East Asia have less than one-third the number of persons per physician and per nurse than do the developing countries as a whole.

Demographic characteristics also vary between regions. The contrast between the developing nations of Africa and East Asia was most marked. In 1975, the rate of natural increase and the total fertility rate in the former was almost twice that of the latter. And, as would be expected, the life expectancy at birth and proportion of the population of working age (15-64) was much lower in Africa than in East Asia.

When the 104 non-oil exporting countries are cross classified into one of seven levels of GDP per capita and one of seven levels of the total fertility rate, the distribution of countries demonstrates a clear overall inverse relationship between the two variables. With but three exceptions, China, Mauritius and Sri Lanka, all countries with a GDP per capita below $ 350 had a TFR above 5.0. Similarly, with three exceptions, Ireland, Israel and Puerto Rico, all countries with a per capita GDP above $ 1,400 had a TFR below 2.5. Though, there was no such uniformity when countries in the range of $ 350 to $ 1,399 were considered, the overall pattern tends to support the claim that conditions associated with very low income levels inhibit processes, such as development, which would moderate high population growth rates by reducing fertility.

A similar matrix linking GDP per capita with life expectancy at birth demonstrates that expectations of life is positively related to per capita GDP. With but two exceptions, countries having a per capita GDP in excess of $ 1,400 had life expectancies at birth exceeding 70 years and with but one exception, Sri Lanka, countries with a per capita GDP below $ 200 had life expectancies at birth of less than 55 years. In the intervening range, the modal level of life expectancy varied directly with per capita GDP.

During the period 1960 to 1975 there was no narrowing of the gap between the per capita GDP of the developing and the developed market economies. On the contrary, it grew from $ 1,846 in 1960 to $ 2,998 in 1975. The GDP of the developing economies grew at a rate which was 1.4 percentage points higher than the developed market economies, though 1.0 percentage point below the centrally planned economies. Population in the developing countries increased at a rate which was more than twice the rate in the developed market and centrally planned economies. Consequently the rate of growth of GDP per capita in the developing countries was only 3.2 per cent compared with 3.3 per cent in the developed market economies and 5.5 per cent in the centrally planned economies.

Though the rate of growth of per capita GDP in developing countries was only slightly less than that of the developed market economies, the annual increment in the GDP per capita of developed market economies exceeded the corresponding increment in the developing countries by a factor of twelve. During this same period the rate of natural increase in developed market countries declined annually by .28 persons per thousand. The corresponding decrease in the developing countries was .06 persons per thousand.

In the period 1960 to 1975, the average annual rate of growth of GDP per capita was 6.6 per cent in the oil exporting countries as compared with 2.7 per cent for the other developing countries, despite the fact that the rate of natural increase in the former was 20 per cent higher than that in the latter.

There were also marked regional differences in patterns of socio-economic change between 1960 and 1975, however they were not related in a uniform way to regional changes in demographic variables. For example the annual increment in per capita GDP in Latin America was almost three times that of all developing nations, yet the annual decline in the total fertility rate in East Asia was more than six times that of the developing countries as a whole.

The findings of this study demonstrate that demographic factors alone cannot adequately explain observed disparities in levels of GDP per capita and other socio-economic indicators as they existed in 1975 or as they changed between 1960 and 1975. However an unmistakable pattern emerged in which *per capita* GDP was inversely associated with fertility and directly associated with life expectancy at birth.

With the exception of the oil exporting developing countries, the findings of this analysis generally tend to substantiate the view that low *per capita* GDP and associated socio-economic conditions tend to perpetuate high fertility and rapid population growth and conversely, rapid population growth inhibits the rapid growth of GDP *per capita.* Therefore, the economic disparities between nations might have been narrowed between 1960 and 1975 had population growth rates in the developing countries been more moderate.

POPULATION POLICY

In 1980, most Governments consider the different problems arising from the evolution of their population situations as critical factors for the success of their national development plans. Governments recognise that population problems are not limited to population growth, but also include an uneven distribution of the population within the national territory. They also realise that fertility problems are not limited to the global aspects and effect on population growth, but also include individual aspects such as those relating to an individual's rights. Furthermore, national recognition of the importance of population and of its close relationship with economic and social development has been accompanied by a growing awareness of the possible international consequences of national population policies.

The following analysis of Governments' perceptions, policies and measures in relation to population is based entirely on official government sources, including replies to the most recent population inquiry conducted by the United Nations, entitled "Fourth Population Inquiry Among Governments in 1978: Review and Appraisal of the World Population Plan of Action", and statements made by Governments on different occasions, and national development plans.

Natural Increase/Population Growth

In 1980 most Governments considered that the changes in their rates of natural increase were among the most important determining factors in the formulation of their development policies, an opinion held by both developed and developing countries. At the world level, 35 countries out of a total of 165, representing 12 per cent of the world's population, perceive an increased rate of growth as desirable; 75 others, having 29 per cent of the world's population, express satisfaction with their rate of natural increase, while 55, containing 59 per cent of the world's population, desire an increased rate of growth.

Among the developed countries 11 out of 39 desire a higher rate of population growth, while the remaining 28 countries are reportedly satisfied with their rates of growth. In the developing countries, on the other hand, the situation is almost entirely reversed: 24 out of 126 countries desire an increased rate of growth, 47 are reported satisfied, and 55 (representing 79 per cent of the total population in the developing countries) desire reduced rates of population growth. If the perception of the rate of natural increase is classified by population size rather than by number of Governments, the distribution becomes markedly assymetric due to the considerable demographic weight of the large Asian countries, all of which desire a reduced growth rate.

In the developed countries, the achievement of a net reproductive rate of less than unity, and the increasing size of the old-age population have played an important, though not necessarily decisive, role in the formulation of Governments' perceptions regarding the rate of population growth. Indeed, none of these countries desire a lower rate of natural increase, but among those countries satisfied with their rates of natural increase and those that consider it too high, the observed variations do not occur in a different demographic context but rather as a result of divergent estimations of the social and economic consequences of the same demographic trends.

Between 1978 and 1980 no radical change in the Governments' perceptions was observed. In fact there has been a reinforcement of previous perceptions. At the same time in many countries of Western Europe a debate as to whether or not to change the official positions, has developed among the general public and in governmental circles.

In developing countries, the maintenance of a high net reproduction rate, the increase in the already high dependency ratio, accompanied by a simultaneous increase of the economically active population, has led many Governments to express dissatisfaction with the levels and trends of their rates of natural increase. Most developing countries having populations of more than 50 million consider their rates of natural increase as too high. With some notable exceptions the developing countries which are satisfied with their rates of growth or which perceive them as too low, are generally the smaller countries where the level of mortality is still very high.

In the ESCAP region the dissatisfaction with current rates of natural increase is the greatest since 16 out of 30 countries, representing 90 per cent of the regional population, desire a reduced rate of growth. The developing regions that are generally more satisfied with their rates of growth are found in the ECA and ECWA regions. The proportion of countries desiring a higher rate of growth is greater in the latter region.

Governmental intervention in regard to the rate of natural increase is seldom undertaken in an isolated manner. The general practice is to combine various interventions. In fact, modern population policies are generally multidimensional in character. It is therefore necessary for Governments to formulate and combine the most effective set of interventions. This analysis will be limited to the combinations of options most frequently utilised today in reference to the categories of perception and the rates of natural increase.

When the rate of natural increase is perceived as satisfactory, one observes less pressure to modify fertility for demographic reasons and emphasis is placed on fertility policy measures aimed at improving individual well-being. In this situation, spatial distribution interventions also play an important, although non-essential role. The same goes for international migration and changes in the socio-economic structure. On the other hand, when the rate of natural increase is perceived as being too high, emphasis is generally placed on reducing fertility in combination with interventions relating to spatial distribution. The reorganisation of socio-economic structures in accordance with the national development strategy also receives a relatively high priority.

Finally, in cases where the rate of natural increase is considered as too low, one of the following situations is likely to pertain: either fertility and mortality rates may both be too high, or else both may be low. In the first case, typified by countries in the early stages of the demographic transition, priority is accorded to a reduction in mortality in association with efforts towards a spatial redistribution of the population. Fertility interventions as well as international migration, generally receive a lower priority while efforts for socio-economic restructuring receive a higher priority. In the second case, typified by countries in the final phase of their demographic transition, emphasis is placed on fertility increase with an explicit demographic objective in combination with an objective to enhance well-being. In a few cases, mortality, intervention is considered as having an important role particularly if a resort to international migration is limited. It is necessary tó constantly adapt socio-economic structures in accordance with internal and external economic pressures so that interventions in this area are carried out in the most systematic way possible.

Mortality and morbidity

The reduction of mortality, and the improvement of the health status of the population are universal objectives, though governments differ in the strategies used to attain them and on the demographic role assigned to these strategies. Governments for whom mortality and morbidity policies also serve demographic objectives, are few in number and generally are among those governments that consider their rate of natural increase as being too low, thus the reduction of mortality constitutes a way to maximise the demographic effect of existing fertility and therefore to influence the rate of natural increase.

Intervention to reduce mortality and thus to improve health status has high priority among all Governments. In a previous report it had been indicated that mortality followed spatial distribution in the hierarchy of problems raised by changes in the population situation.[5] The situation remains the same in 1980. Out of a total of 165 countries, 107 consider their current level of life expectancy as unacceptable. In fact, no government perceives its existing levels of mortality as totally satisfactory. However, some governments concede that their current level is acceptable given prevailing circumstances and taking into account the diverse constraints which restrict the reduction of mortality.

The acceptability of mortality levels generally increases with the length of life expectancy at birth. For instance, nearly all of the 50 countries having an expectancy of life at birth of less than 50 years feel that the level is unacceptable, while only 7 out of 42 countries which have attained a life expectancy of more than 70 years consider the level as unacceptable. Among the 39 industrialized countries, 9 consider the level unacceptable and 30 as acceptable. In the 126 developing countries the frequency of "unacceptable" responses is much higher: only 28 countries consider the level acceptable whereas 98 consider it as unacceptable.

In the developed countries, efforts are increasingly directed at reducing the differentiating factors still existing between the diverse categories of the population, particularly those which are exposed to specific risks due to living conditions, occupational hazards, and place of residence. Special attention is also being given to the factors associated with adult male mortality and the gap between male and female mortality at the older ages.

In the 1970's, concern was expressed in regard to a slowing down of the decrease in the mortality rate of developing countries. In 1980, this concern still persists although the analysis of the presently available data provides a clearer reflection of the situation. In any case, based on the mortality projections of the Population Division of the United Nations, it appears unlikely that the objective proposed by the World Population Plan of Action (to achieve at the world level an expectancy of life at birth of 62 years) will be attained by 1980.

The distribution of deaths by age and cause in developing countries reflects, the importance of the proportion of deaths in the 0-4 years age group and the predominance in all age groups of deaths due to exogenous causes. Some of these, could be easily averted by utilizing inexpensive cures and through an improvement in the conditions of living. Since the Alma-Ata Conference, a new orientation has come about giving priority to primary health care especially for high risk groups, such as infants, women of child-bearing age, rural populations and the underprivileged in urban areas. Although the importance of certain types of medical care are widely recognized, priority has been given to efforts concerning environmental sanitation and the non-medical determinants of health.

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[5] World Population Trends and Polocies - 1979 Monitoring Report, Volume II. United Nations, New York, Sales number E.79.XIII.5, 1980.

Fertility

The perceptions which Governments adopt in regard to fertility may be examined from the point of view of their effect on the global level and trends of the rate of natural increase, and from the point of view of their effect on the well-being of families and individuals. Of course a direct relationship exists between the two points of view: the progressive polarisation of individual behaviour around certain norms of reproduction can lead governments to consider global fertility levels as unsatisfactory.

At the world level, 22 countries consider their fertility rates as too low, 59 as too high and 84 express satisfaction with their current rate. In the developed countries, 8 out of 39 consider their level of fertility as too low, the remaining 31 countries consider it as satisfactory. In developing countries the distribution is almost reversed; 14 countries out of 126 consider their fertility level as too low, 53 are satisfied and 59 consider it too high. An "unsatisfactory" perception does not necessarily imply that governments have decided to intervene or that they have already intervened. At the world level, 17 of the 22 countries that consider their fertility as too low intervene to regulate the rate, and 38 out of the 59 countries that consider their rates are too high indicate intervention. The category of satisfied countries (84) is heterogeneous; some are satisfied because their intervention has been successful and others because the trends have been satisfactory. Among the group of countries expressing satisfaction, 31 have adopted measures for maintaining fertility at the currently satisfactory level.

In the developed countries, the types of intervention may be grouped into three broad categories: legal measures aimed at permitting couples to exercise in a more or less free manner their reproductive choices, economic measures aimed at compensating families for the expenses associated with having children or bringing about desired fertility behaviour through a progressive system of benefits and finally measures aimed at reducing the conflicts between work and maternity.

Legal measures concerning access to contraception have evolved considerably. A majority of the developed countries, whether pronatalist or not, are today committed to very liberal legislation; only a few maintain a restrictive attitude. National legislation has recently been undergoing a liberalisation, only three countries still restrict access to modern methods of contraception. Of 39 developed countries, 13 permit abortion on demand, 16 permit it for socio-economic reasons and 28 for broad medical reasons. Nevertheless, certain restrictions have been imposed in some countries where abortion was formerly available on request. On the other hand, other developed countries have liberalised their legislation on abortion. Legislation concerning sterilization is often more difficult to interpret because of the ambiguity of its range of application. Taking into account this restriction, it appears that 16 countries permit sterilisation on demand, 2 for socio-economic reasons and 2 for medical reasons.

The second method of intervention includes the taking of responsibility by the State for a share of the expenses incurred in child support. Most modern states have a system of compensating for family expenses (such as a reduction in taxes) and/or family allowances thus pursuing the often indistinguishable objectives of social justice and fertility increase. In the few pronatalist countries of Western and Eastern Europe, the second objective has been clearly underlined and strongly accentuated in the past few years by placing emphasis on having a third child.

The third method of intervention involves a combination of measures aimed at resolving the conflict between maternity and work. This has seen a major development in the countries of Eastern Europe. With the help of the governments of these countries, the reconciliation between the roles of mother and working woman, has created the conditions necessary for a resumption of natality. In some Eastern European countries have instituted legal arrangements or measures allowing mothers to meet their educational responsibilities (through the creation of crèches), to improve their professional qualifications (through study leave), paid leave for raising children.

Among 126 developing countries 59 perceive their fertility rates as too high. Of these the largest proportion (in terms of countries and in terms of population) are in the ESCAP region and the smallest in the ECWA region. In the policy area, 38 governments of developing countries have adopted specific policies to reduce fertility, and once again, the largest proportion with anti-nationalist interventions is to be found in the ESCAP region.

The major directions taken by anti nationalist policies in 1980 consist of a coherent collection of measures aimed at improving the supply of family planning services and developing an overall demand for them to encourage parents to have fewer children and thus to have recourse to family planning services). Concerning supply, one finds not only legal measures but also technical measures. In reference to demand, policy interventions include economic incentives or disincentives, information and education measures, legal measures, and finally actions of a general nature on the socio-economic determinants of fertility behaviour.

A set of actions have been taken by governments for legalizing and facilitating the access to modern methods of contraception, abortion and sterilization. Only 9 out of 126 developing countries still restrict access to modern methods of contraception, on the other hand, 81 support direct access to these methods. Nevertheless, if all countries having an anti-natalist policy directly support access to modern methods of contraception, it is also true that even more countries, without anti-natalist policies or having pronatalist policies, indirectly authorise or support access to these methods, but in this case with the objective of promoting individual well-being. Whatever the situation may be, the general direction is towards liberalization.

In numerous anti-natalist countries abortion is very strictly regulated whereas it is permitted on demand in some anti-natalist countries. In developing countries for which information is available, 5 countries permit abortion on demand, 9 for socio-economic reasons and 46 on broad medical grounds. The other countries have a very restrictive approach and such that abortion is considered legal only when the life of the mother is in danger or in specific juridic or eugenic cases.

The situation in regard to sterilization is still more complex. In many countries clear legislation has been formulated, but in others the law is still uncertain. Of the 101 developing countries for which information is available, 27 countries permit sterilization on demand, 4 for socio-economic reasons, 7 for reasons linked exclusively to family planning, 21 for medical reasons and the remaining 52 for restraining indications only. The ambiguities of the judicial status of sterilization in many countries has not prevented its emergence as a form of contraception, even after the setback observed in 1976 following the state of emergency in India. It has been estimated that in 1977, 80 million sterilizations had been performed worldwide (as compared to 20 million in 1960), with 64 million in the developing countries. The distribution by broad regions is as follows: ECA, 0.5 million; ECWA negligible; ECLA, 3 million; and ESCAP, 60.5 million (16 million sterilizations had been performed in the EEC region).

Over the past few years different measures have been undertaken to improve the diffusion and supply of family planning services. First of all, the trend towards integrating these programmes with health services, which began with services for maternal and child protection, has progressed considerably. The final statement of the Alma Ata Conference reinforced this already well established tendency. New approaches have recently been attempted to integrate family planning services into activities other than health programmes, such as integrated rural development. Another way of improving the supply of, and to some extent the demand for, contraceptive services consists of making the programmes community based, emphasizing units such as the village, neighbourhood or the factory. The growing utilization of paramedical personnel also constitutes an area of priority action to increase the diffusion of family planning services. Finally in this context one can mention the "demedicalization" of contraception, that is, the sale of contraceptive products through other channels, whether traditional or modern.

However, the use of economic incentives or disincentives which tend to influence the demand for family planning services appears to have greatly increased in recent years. They are aimed at individuals and to an increasing degree are community based. Economic incentives are more frequent than disincentives due to the low level of development of many of the concerned countries. A less direct type of economic incentive consists of encouraging families to limit the number of their children through the use of deferred incentives, such as pension funds.

Besides incentive measures, certain governments have also taken disincentive measures. Singapore, for example, is well known to be a leading country in this area; recent development in other Asian countries have confirmed the efficacy of these measures when applied in the socio-economic context specific to the country's stage of development.

In order to have a short and the long term impact on the motivation for couples to have smaller families, governments have supported campaigns, utilizing traditional and modern methods of communication.

Among the legal measures which have had a significant effect on fertility, are changes in the age at marriage, particularly in regard to women. Among some developing countries having anti-natalist policies, the minimum age at marriage has recently been increased. At the present time, this is the only measure imposed at the national level which is coercive in the legal sense of the word.

Finally, considerable interest has been shown since Bucharest in reference to the eventual effects of intervention based on the socio-economic determinants of fertility such as education, health, employment, income distribution, status of women, and land reform. Nevertheless, development plans adopted since that time by countries having anti-natalist policies, indicate that efforts in these areas have largely been made for non-demographic reasons.

In general it is the use of economic incentives and disincentives (mainly in Asia) and improvements of methods of supply of family planning services (in all the anti-natalist countries) that appear to be the main features of recent anti-natalist policies. The proliferation of economic incentives raises financial problems and there is a great temptation to resort to some sort of pressure, first as a complement to and then as a substitute for these expensive incentives.

Spatial Distribution and Internal Migration

Among the demographic processes considered by the Government's to be most frequently associated with problems of development, spatial distribution of the population comes first. At the world level it is observed, that only 19 countries out of 165 consider the geographic distribution of their population as acceptable; of the remaining 146 countries 79 consider it unacceptable to a large extent and 67 consider it unacceptable to a lesser extent.

In line with the history, economy or ideology of each country, important differences exist in the modalities of government intervention in regard to spatial distribution. For instance, in Eastern Europe, particularly in the USSR, rapid urbanisation has not been accompanied by a mass concentration of the population in large metropolitan areas, as was the case in Western Europe. Among the governments of industrialized countries in only 3 countries out of 39 consider the geographic distribution of their population as unacceptable to a large extent, 22 as unacceptable to some extent and only 4 consider it to be acceptable.

Government policies may be classified as those designed to modify the migratory flow and those designed to modify the spatial configuration of human settlements. No more than 39 developed countries wish to accelerate the migratory flow. On the other hand, 22 desire to reduce it, 6 to accelerate it and 11 do not desire any intervention. Regarding the spatial configuration of urban settlements (for example, creation of new towns) or rural settlements (relocation of the population to specific rural zones), 18 countries do not desire specific action, 16 favour intervention for urban areas only, 5 favor intervention for urban and rural areas and none for rural areas only.

One can distinguish collective or individual measures, whether incentives or disincentives, whether direct or indirect, which aim at influencing individual or collective migratory behaviour. Among the collective measures, are those that favour the development of industrial infrastructure and others that restrict or do not permit this form of intervention. Among the individual measures of intervention are incentives including grants for relocation, settlement and job training, or disincentives such as special taxes or even the restriction of freedom of movement. In general, outside of direct government interventions such as the creation of social and economic infrastucture or employment in the public sector, incentives or disincentives appear to be more frequently utilised.

Governments of developing countries are also very conscious of the gravity of the situation in that 110 out of a total of 126 considered the distribution of their population as unacceptable to a varying degree. The largest proportion of countries considering the situation as unacceptable, were in the ECA and the ECLA regions.

In the developing countries the distribution of preferences is as follows: only 4 countries would like to accelerate the flow, 15 would like to reverse the flow, 79 or the largest proportion wish to reduce the flow with only 28 countries desiring no intervention at all. It is apparently in countries of the ESCAP region that stringent policies are the most common (8 out of 33 countries desire a reversal of the migratory flow). At the same time, some countries seem to have renounced such a policy or made their former policies more flexible. In regard to spatial configuration, 54 countries report no intervention. A majority (60) intervene in both the urban and rural areas, 21 only in urban areas, and 30 in rural areas. Once again it is in the ESCAP region that most interventions are found (24 countries out of 33), The strategies adopted by developing countries to deal with the growth of their urban population most frequently focuses on policies aimed at solving problems caused by a rapid increase. A frequently observed policy is to distribute the flow of migrants between metropolitan agglomerations and other urban centres.

The spatial distribution policies of developing countries often have been and remain exclusively focused on limiting the increase in the populations of metropolitan areas, involving policies which often appear to have failed. Following these failures, certain countries have reacted by altering their spatial distribution policies, giving priority to the development of rural areas. These strategies have consisted of intervening in various aspects of rural development including agriculture, and the social, economic and institutional fields. One of the objectives of this strategy has been to retain an important part of the population in the rural areas. In general, the measures taken to implement spatial redistribution policies are expensive and if their financing comes from national sources they will require a transfer of considerable resources from the urban sector to the rural sector and from the better endowed areas to the poorer areas, thus raising obvious political difficulties. International assistance in this area represents an important, but still limited source of financing.

Most governments of the developing countries consider that the improvement of the spatial distribution of their population is one of the bases of their development policy as well as of their demographic policy. In effect, an improved spatial distribution will influence the components of the rate of natural increase, and on the other hand, will help to adapt the economic system to population pressures.

The problems encountered in coordinating different spatial distribution policies have led a number of developing countries to revise the respective roles assigned urban and rural development; governments are now ready to assign each type of development a more complementary and less conflicting role.

International migration

Many governments consider international migration to be demographically significant. The number of countries considering immigration to be important has reached 47 out of 165 countries; of these, 15 are developed. In the case of emigration, the number has reached 51, 10 being developed countries.

The major countries of immigration are: the oil rich countries in the Middle East and North Africa, the countries of Western Europe and Northern America, in some countries of South America and the industrialised countries of Oceania.

Immigration in the Middle East, formerly more spontaneous or individual, has now become increasingly organised. Certain countries, have adopted measures leading to a better control or restriction of the entrance of immigrants. Other countries, have signed bilateral accords with governments exporting workers with a view to exercising a more effective control over the entrance of foreign workers. The system of sponsorship of foreign workers is largely utilised in the region. By establishing a link between the presence of the immigrant and the execution of a particular project it has contributed to improving the control over the immigrants and has made the foreign workers more mobile and thus less susceptible to integration.

The countries of Europe have a policy which emphasizes the management of the stock of immigrants resident in a country rather than the migratory flows themselves. On the whole, the policies adopted in recent years by the European countries have three objectives: to stabilise or reduce the immigrant population by the means of incentives such as grants for departure, or by means of disincentives such as restrictions on entry, limitation of the number and the length of stay of the resident foreign population, to better integrate the foreign population authorised to stay in the receiving country; to facilitate the reunion of immigrant families.

The countries traditionally exporting workers from the southern basin of the Mediterranean have long been effected by the crisis. Some have adopted a deliberate policy of reintegration which leads one to believe that they no longer consider immigration as one of the important ways to solve their employment problems.

As in many other regions of immigration, illegal migration plays a significant role in Europe. In Northern America the past two years have been marked by the arrival of a large number of refugees from the Caribbean and to a lesser extent, from South-East Asia. The flow of illegal migrants has also been continuing. The governments of the countries of immigration are increasingly concerned with the need to control different migratory movements more effectively and to revise the principles underlying current immigration policies.

Latin America considers the inter-regional movements of temporary workers as important although very few countries try to attract permanent immigrants. A large proportion of these temporary immigrants are illegal.

In Africa, the main areas of attraction are in the western and southern portions of the continent, but it is important to remember that relatively significant migratory movements occur almost everywhere across borders which are easily permeable. In the West there are the traditional receiving countries, Senegal, Ivory Coast, Gabon and to a lesser extent, Ghana. South Africa has always played an important role as a country of immigration in spite of the vicissitudes of politics. In Africa, as in Latin America, immigration is in general of a regional character and it often takes the form of illegal migration. The illegal migration plays a role similar to temporary migration in Europe. Africa is also the continent where one finds the largest number of refugees. The Pan African Conference of 1979 at Arusha attempted to define the principles of an African policy of sharing the costs resulting from the receiving of refugees.

In spite of the fact that Asia includes the majority of countries of emigration, it has also had to receive a considerable flow of refugees in the period under study. This is true in the case of Pakistan where almost one million persons have entered its territory in the past year. This has also been, and still is the case in Thailand, Malaysia and to a lesser extent in Indonesia. Many Asian countries now participate in an immigration towards the Middle East. Some, have even adopted quantitative objectives for emigration in their five-year development plans. Other Asian countries have promulgated legislation to encourage the emigration of unskilled workers but to limit the "brain drain". The emigration situation in the region can be characterised as follows: some countries, having attained an intermediate stage of development, try to associate the emigration of manpower with the export of industrial equipment they produce; another group of countries, at an earlier stage of development, situated in the Indian peninsula and in South-East Asia concentrate their efforts on systematically organising emigration while trying to control its volume and structure.

Australia is one of the few countries of permanent immigration where the objective is to assure a relatively stable flow of new immigrants thus allowing public authorities to adjust annual admissions according to the needs of the economy. New Zealand, on its side, preoccupied with the possibility of a negative balance of migration, has made its restrictive policies towards immigration a little more flexible.

In the developed countries where immigration is considered significant, only one country considers it too low, 9 consider it to be satisfactory and 5 feel it is too high. In developing countries, the numbers are, respectively, 5, 11, and 16.

Concerning policies in regard to immigration, 51 countries at the world level intervene in one way or the other to act upon immigration: 9 to increase it, 17 to maintain it at its existing level and 25 to reduce it. As it could be expected, it is in the EEC region that the largest number of policies exist to reduce immigration (12 countries out of 39). In the developed countries, the distribution between the different policies is as follows: only one country has a policy aimed at increasing immigration, 2 would like to maintain it at the present level and 12 to reduce it. In the developing countries, the figures are, respectively, 8, 15 and 13.

Of 39 developed countries, 10 consider that migration is demographically significant and among the developing countries 51 out of 126 consider it to be significant. Whereas a majority of the concerned developed countries (7 out of 10) consider that emigration is too high, more than half of the concerned developing countries (29 out of 51) consider it as satisfactory, and 3 countries perceive it as too low.

Emigration policies exist in 10 developed countries out of 39 and in 50 developing countries out of a total of 126. The interventions of one or the other group of countries corresponds indirectly with the perceptions described earlier and the highest frequency of restrictive policies concerning emigration (10 countries out of 30) occurs in the ECLA region.

An examination of the present trends of international migration policies shows that it is not easy to analyse policies relating to international migration by utilising the traditional distinctions such as those between temporary migrants, permanent migrants, legal and illegal migrants. It appears that the problem of defining the different categories of international migrants is essentially a political one, governments assigning migrants to particular categories depending upon the needs of the moment.

Undoubtedly, public authorities of the receiving countries find themselves confronted with problems without precedent. Never in human history has the gap between the supply and the demand of international migration been so large. There are a variety of reasons for the migratory flows which contribute to creating or accentuating disequilibrium. There are economic reasons (the gap in levels of living between the North and the South, the massive transfer of populations from the traditional sector to the modern sector in the South, the industrial restructuring occurring in the North), and demographic reasons (the demographic dynamism of the countries of the South is such that, with rare exceptions, migration does not solve the problems created by high rates of natural increase, whereas the volume of migrants is considerable as compared to the capacity of the receiving countries). There are also cultural reasons (attraction to a Western way of life), technical reasons (development of continental and intercontinental means of transportation) and obvious political reasons.

PART ONE

RECENT DEMOGRAPHIC TRENDS

As the twentieth century draws to a close, the evidence continues to mount that a movement towards fertility decline in the developing countries is under way and the trend of moderation in the rate of growth of world population is sustained. Recently revised estimates by the Population Division indicate that the annual rate of growth of the world population may decline to 1.5 per cent by the end of the century, from 1.7 at present and 2.0 per cent fifteen years ago. To be sure, the decline is small and its significance lies mainly in its persistence and anticipated acceleration. Otherwise, substantial population increase, mainly in many of the developing countries, will persist and will continue to be among the major factors influencing the present and future of humanity.

The developing countries, defined here to include all of Africa, Latin America, Asia (outside of Japan and the USSR), and Oceania (outside of Australia and New Zealand), now absorb 70 million additional people annually, or nine-tenths of the global increase, and this additional pressure on their resources and on their capacity for development is not expected to decrease significantly in the near future. In fact the projections indicate that towards the end of the century the annual addition to the population of the developing countries may well increase to 84 million or 93 per cent of the total annual increase in world population. If this trend continues, the population of the developing regions will increase by almost 50 per cent (1500 or 1600 million), between now and the year 2000. This increase will materialize despite the anticipated decline in the birth rate of these countries from 32 per thousand at present to 26 in the year 2000 and a corresponding decline in the rate of growth from 2.1 to 1.7 per cent. Clearly the decline in the death rate from 12 to 8 per thousand in the same period will partially offset the impact of the fertility decline.

The decline in the birth rate of the developing countries from its original level of about 41 per thousand during 1960-65, was largely brought about by declines in China and in several East-Asian, South-Asian and Latin American countries. This trend has gained momentum and widening currency, but little or no decline is yet apparent in other areas, particularly in Africa and South Asia. Thus fertility levels within developing countries are enormously heterogenous at present.

Beside the initial fertility decline in the developing countries, another main feature of the current demographic situation is the continuing fertility decline in the developed countries (Europe, Northern America, USSR, Japan, Australia and New Zealand) which has been under way since the end of the post-war baby boom. The average birth rate in these countries declined from a high of about 22 per thousand in the 1950's to 17 in 1970-75 and to less than 16 during 1975-80. In fact, by the mid-1970's, fertility in the majority of these countries was already below replacement level, but the large numbers of young adults who were born during the baby-boom years of the 1950's are responsible for maintaining a positive balance of births over deaths in most countries. By 1978, fertility was above the replacement level in only 7 out of 24 western developed countries. Even these seven countries were not far from the replacement level and the current trends indicate that it will not be long before they attain that level. Although the East European countries have recently experienced a variety of fertility trends, their current fertility levels are either below the replacement level or not far above it.

During the remainder of this century, as the relatively large cohorts of women of reproductive age are replaced by smaller cohorts born in the 1960's and 1970's, the balance of births and deaths in the developed countries will become negative unless fertility increases. In fact, the "medium" projections of the United Nations anticipate that such an increase of the total population of these regions between 1980 and 2000 amounts to one eighth, or about 140 million, despite the continued decline in the rate of growth which is projected for these regions, from about 0.7 at present to 0.5 near the turn of the century.

Mortality regained world attention in the 1970's as a serious demographic problem amid fears that earlier assessments of its levels and trends may have been too optimistic in so far as many developing countries are concerned. Despite the difficulty of obtaining reliable data, all estimates indicate that mortality in Sub-Saharan Africa is still very high and that except for a small number of countries, life expectancy there is below 50 years and will probably fall far short of targets set for 1985 by the World Population Plan of Action.

The situation is somewhat better in North Africa and South Asia where life expectancies are around 55 years, with some notable exceptions which have higher mortality. On the other hand, several countries of East Asia, and others like Kuwait have managed to reduce mortality to or near the levels prevalent in the developed countries. Most of Latin America also has low or relatively low mortality levels, but a slackening in the rate of decline in some of its countries has raised concern. On the other hand mortality decline in the developed countries has gained momentum in the 1970's, and in several of these countries female life expectancy has reached 78 years.

Infant mortality remains most critical in Africa and South Asia. Whether in Sub-Saharan Africa where levels are near 200 infant deaths annually per 1000 live births, or in North Africa and South Asia where they are generally within the range of 100-150, infant mortality is much higher than the levels attained elsewhere. The low levels are not confined to the developed countries where they are mostly between 7 and 15; a number of developing countries have also made impressive gains during the last decade and brought infant mortality rates down to levels below 30. Child mortality (ages one to four) also remains very high in many developing regions. Available estimates range between 4 and 40 per thousand, while in the developed countries these rates are one per thousand or less.

Although population age structure does not normally change rapidly, declining fertility in the developing countries has caused a corresponding decline in the proportion of child and young population (aged 0-14) from 42 per cent in 1970 to an estimated 39 per cent at present. Though the proportion is still much higher than the 23 per cent observed in the developed countries, the decline is significant and largely brought about by fertility decline in China. The old-age component in developing countries, though still relatively small, is growing rapidly, and in some countries where fertility is declining rapidly, mainly China, it will not be long before the social and health problems of this component of the population are as important as they are at present in the developed countries. These countries already have 11 per cent of their population in this group, and the percentage is expected to increase to 13 in 2000.

The imbalance between urban population growth and the availability of essential services and employment is causing serious problems, particularly in the developing countries. Since the middle of this century the urban population of these countries has increased almost four-fold, to about one billion. With a rate of growth of almost four per cent at present, it is expected to double over the next two decades. The growth rate of the urban population of the developed countries is currently 1.4 per cent and has been consistently declining. Between now and the year 2000 it is estimated to increase by only about 25 per cent. The developed countries are thus expected to be about 80 per cent urban in that year.

The substantial urban growth in the developing countries, which would make these countries 44 per cent urban in 2000 compared to only 17 per cent in 1950, does not imply an alleviation of population pressure in their rural areas. In fact the population of these areas is now increasing at an average rate of 1.4 per cent and although the projections anticipate a rapid decline in this rate, an increase in the rural population of 500 million, or more than one-fifth during the next two decades is implied.

During the same period the rural population of the developed countries is expected to decline by one fifth.

A main feature of current and anticipated urban growth is that it is "large-city" oriented. This trend is particularly obvious in the developing countries where during the last decade the number of cities of four million or more inhabitants increased from 12 to 23 and is expected to exceed 60 in the year 2000. The projections indicate that by the turn of the century a quarter of the urban population of the developing countries would be living in such cities. This type of expansion is at the expense of towns of half a million population or less in both developed and developing countries; the share of these towns has declined from 58 per cent of the world's urban population in 1970 to 54 per cent at present and is expected to continue its decline to slightly under 50 per cent in 2000. Cities of between half a million and four million persons, though increasing substantially in numbers, are maintaining a relatively stable share of the urban population.

The early 1970's witnessed a continuation of the earlier pattern of international migration, namely movement of workers, mainly males from poorer to richer countries, in search of employment in areas enjoying economic growth and rising demand for labour. This pattern described movements between Latin America and Northern America, within Europe, and into Europe from North Africa and Asia. In the European countries of immigration, the inward movement of workers has stabilized though the stocks are still substantial. The friction between foreign and national labour and the problems encountered in returning temporary foreign workers to their countries of origin have accordingly been reduced.

A new pattern of international migration, which has gained momentum during the last decade, is the flow of migrants to the oil-rich countries of Western Asia and elsewhere in the developing countries. It is estimated that the number of migrant workers employed in the oil-rich Arab countries, coming mainly from other countries in the region, has doubled between 1970 and 1975, reaching about two million in the latter year. Similarly, there are substantial numbers of migrant workers in some West African countries who come from the landlocked countries to their north. A similar but declining flow exists in South Africa.

Chapter 1

WORLD AND REGIONAL POPULATION GROWTH

A. Global trends

According to the provisional findings of the United Nations world demographic estimates and projections as assessed in 1980, the total population of the world is estimated to be 4,440 million for 1980 with an annual rate of growth of 1.7 per cent. This rate appears to be in line with the gradual declining trend started around the middle of the 1960s when the world population was growing at an estimated rate of 2.0 per cent. In spite of this apparent abatement in the rate of population growth in the 1970s, the size of the annual addition to the existing world total has been increasing steadily to the current level of 80 million per year. This is the largest increment observed thus far and the size of annual increments is likely to increase further in the future.

The seemingly contraditory trends between the magnitude of the increase and the percentage rate of change can be explained by the fact that the size of the world population has grown so much. For the same reason projected annual increments in the size of the global population will continue to increase for the coming 30 to 40 years even with the anticipated further decline of growth rate assumed in the United Nations medium variant projection. During the past three decades, from 1950 to 1980, the world population has increased by 1.9 billion from 2.5 to 4.4 billion, while 2.6 billion persons are expected to be added in the coming three decades, bringing the world total to 7 billion by 2010 (see table 1.1).

The global trend in population growth tends to mask the full implications of this process in regard to critical development issues because of the large differentials in population growth between developed and developing regions and among the developing regions themselves. First, the most notable differentials in growth trends may be found between the two groups: the more developed regions and the less developed regions. The population of the less developed regions of the world today, which, for statistical convenience, is defined here as consisting of Africa, Latin America, Asia and Oceania, excluding Australia, Japan and New Zealand, comprises three quarters of the world total popualtion and is growing at an estimated average annual rate of 2.1 per cent. In contrast, the annual rate of population increase in the more developed regions consisting of Northern America, Europe, USSR and the three countries mentioned above is 0.7 per cent on the average, which is one-third of the average rate for the less developed regions.

Table 1.1 Population trends and prospects in the more developed regions and the less developed regions, medium variant, 1950-2025

Year	World		More developed regions a/		Less developed regions b/	
	Population (million)	Rate of increase (percentage) c/	Population (million)	Rate of increase (percentage) c/	Population (million)	Rate of increase (percentage) c/
1950	2,522	-	832	-	1,690	-
1955	2,754	1.76	887	1.28	1,867	1.99
1960	3,034	1.94	945	1.27	2,089	2.25
1965	3,350	1.98	1,003	1.19	2,348	2.33
1970	3,690	1.93	1,049	0.91	2,641	2.36
1975	4,069	1.93	1,093	0.82	2,976	2.35
1980	4,437	1.73	1,132	0.71	3,305	2.10
1985	4,835	1.72	1,172	0.69	3,663	2.06
1990	5,255	1.67	1,209	0.62	4,047	1.99
1995	5,697	1.61	1,245	0.59	4,452	1.91
2000	6,146	1.52	1,276	0.49	4,871	1.80
2005	6,592	1.40	1,299	0.37	5,293	1.66
2010	7,029	1.28	1,319	0.31	5,710	1.51
2015	7,456	1.18	1,337	0.27	6,119	1.38
2020	7,870	1.08	1,353	0.23	6,517	1.26
2025	8,259	0.97	1,366	0.20	6,893	1.12

a/ "More developed regions" include Europe, Northern America, Australia, Japan, New Zealand and USSR.

b/ "Less developed regions" include Africa, Asia, Latin America and Oceania, excluding Australia, Japan and New Zealand.

c/ Average annual rate of increase for each five-year period since the preceding date.

Source: Preliminary results of the United Nations demographic estimates and projections as assessed in 1980.

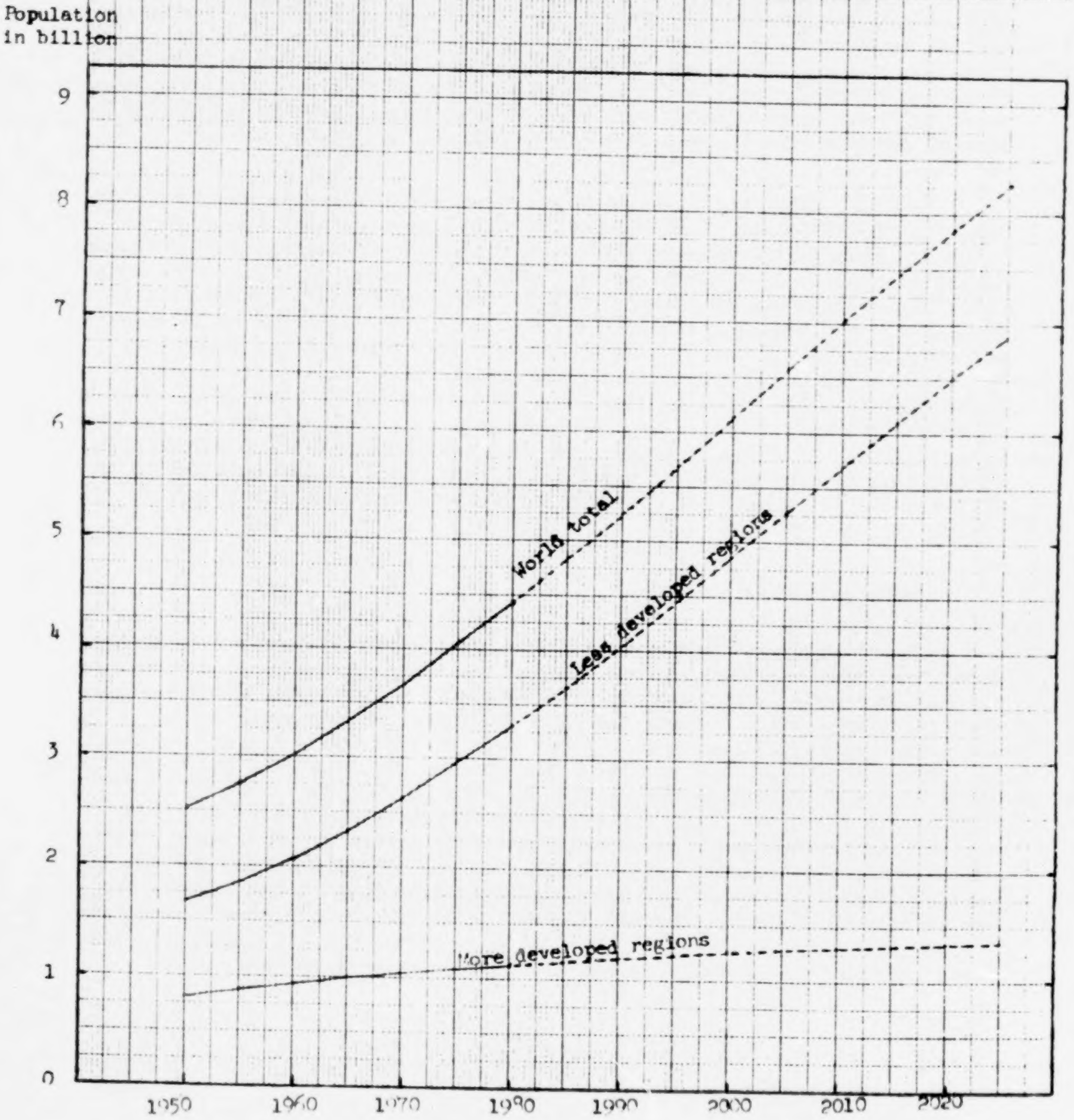
In terms of the size of population, the global population growth in the past 30 years and especially in the 1970s has largely been due to population growth in the less developed regions and their contribution appears likely to expand in the future. From 1970 to 1980 the increase of population in the less developed regions as a whole was 660 million and comprised 89 per cent of the global increase while the more developed regions as a whole increased their population by 83 million in the same decade. In the 1980s and the 1990s, population growth in the less developed regions is projected to exceed 740 million and 820 million respectively, while the projected increase in the more developed regions will gradually decline to 77 million and 67 million in the 1980s and 1990s respectively. Thus, the share of the global population growth accounted for by the less developed regions, which had been increasing from 78 per cent in the 1950s to 84 per cent in the 1960s, will rise to over 90 per cent in the coming several decades (see figure).

Another important feature in the demographic development which took place in the 1970s and is also expected to become more significant in the 1980s is the enlarging growth differentials among the less developed regions themselves. According to the United Nations estimates for the period 1975-1980, the average annual growth rates by the major regions ranged from a high of 2.9 per cent for Africa, followed by 2.5 per cent for Latin America and 2.2 per cent for South Asia, to a low of 1.4 per cent for East Asia. Moreover, there are indications that these growth differentials among the major regions are widening. From 1960-1965 to 1975-1980, the annual growth rate declined only slightly in South Asia while it increased in Africa by 0.4 percentage points. In short, the less developed regions today seem to be dividing themselves into a group of countries with persistently high growth rates and groups of countries with growth rates decelerating at varying paces (see table 1.2).

B. Less developed regions

One of the most prominent features of the recent demographic trends among the less developed regions is the increasing diversity in the rate of population growth. In the 1960s differences in growth rates among regions were relatively small. Among the major regions, the highest rate was estimated for Latin America at 2.8 per cent in 1960-1965, closely followed by a rate of 2.5 per cent per annum for Africa. In Asia as a whole (excluding Japan), population growth was relatively slow in 1960-1965 with an annual rate of 2.2 per cent. This situation has radically changed in the 1970s and the gap between the highest and the lowest growth rates widened. In Africa the growth rate rose to 2.9 per cent in 1975-1980 mainly due to a decline in death rates while East Asia (excluding Japan), due largely to the experience of China, has had a dramatic decline in its growth rate from 1.9 per cent in 1960-1965 to 1.4 per cent in 1975-1980. In South Asia and Latin America, the growth rate has declined slightly (see table 1.2).

Figure. Past Trends and Future Prospects of Population in The World, The More Developed Regions, and The Less Developed Regions, Medium Variant, 1950-2025



Disparities in growth rates are also widening among smaller regions within each major region. In Latin America three countries, Argentina, Chile and Uruguay, which are grouped together as Temperate South America, experienced a further decline in their growth rate in the 1970s from an already low rate of 1.7 per cent in 1960-1965 to 1.3 per cent in 1975-1980. The Caribbean region also had a decrease in its growth rate from 2.3 per cent in 1960-1965 to 1.9 per cent in 1975-1980 while the average growth rate appears to have remained at around 3.3 per cent per annum in Middle America, an area from Mexico to Panama, during the past two decades. The average rate of growth in tropical South America decreased from 3.0 per cent in 1960-1965 to 2.5 per cent in 1975-1980, On the other hand, in Western South Asia which comprises countries in the Arabian Peninsula and up to Turkey and Cyprus, a rate of more than 2.8 per cent per annum has been sustained during the 1960s and 1970s while Eastern and Middle South Asia experienced a moderate decline in the growth rate from 2.4 per cent in 1960-1965 to 2.1 or 2.2 per cent in 1975-1980.

C. More developed regions

The population of the more developed regions of the world, estimated at 1,132 million for 1980 or 26 per cent of the world total, has been growing at a low and declining rate since the 1950s when the average annual growth rate was about 1.3 per cent. That rate has subsequently declined to less than 1.0 per cent in the latter half of the 1960s and 0.7 per cent in 1975-1980. Due to the fact that the birth rate is expected to recover slowly, if at all, and the death rate is expected to rise due to the aging of the population, the growth rate is projected to decline continuously, falling below 0.5 per cent by 2000 and 0.2 per cent by 2025. The percentage of the world population living in the presently more developed regions is thus projected to decline from 26 per cent in 1980 to 21 per cent by 2000 and 17 per cent by 2025, if the United Nations assumptions on future fertility and mortality rates should hold.

Among the more developed regions, Europe appears to have the lowest rate of population increase. In the period of 1975-1980 it grew at an annual rate of 0.4 per cent. If Europe is divided into East, North, South and West, Northern and Western Europe have pratically reached a state of zero population growth registering annual growth rates of 0.10 and 0.05 per cent respectively. In contrast the populations of Eastern and Southern Europe both grew at an annual rate of 0.7 per cent in the 1975-1980 period owing to moderately high birth rates of 18 and 16 per 1,000 respectively. Outside Europe, the average annual rate of population increase for the 1975-1980 period was around 0.9 per cent for Japan, Northern America as well as USSR, and 1.2 per cent for Australia-New Zealand. In all the more developed regions mentioned above, population is projected to grow at a similar, if not lower, rate in the near future.

TABLE 1.2 PROVISIONAL ESTIMATES AND PROJECTIONS OF POPULATION AND AVERAGE ANNUAL RATES OF GROWTH, 1960-2025.

	POPULATION (IN MILLIONS)								AVERAGE ANNUAL RATE OF GROWTH (PERCENTAGE)							
	1960	1970	1975	1980	1985	1990	2000	2025	1960-1965	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000	2020-2025
WORLD TOTAL	3034	3690	4069	4437	4835	5255	6146	8259	1.98	1.93	1.73	1.72	1.67	1.61	1.52	0.97
MORE DEV. REGIONS	945	1049	1093	1132	1172	1209	1276	1366	1.19	0.82	0.71	0.69	0.62	0.59	0.49	0.20
LESS DEV. REGIONS	2089	2641	2976	3305	3663	4047	4871	6893	2.33	2.35	2.16	2.06	1.99	1.91	1.80	1.12
AFRICA	275	355	407	470	546	635	853	1542	2.48	2.72	2.90	3.01	3.03	2.99	2.90	1.90
EASTERN AFRICA	77	100	115	134	156	183	250	478	2.63	2.76	2.94	3.10	3.17	3.17	3.12	2.09
MIDDLE AFRICA	35	42	47	53	61	70	91	162	1.77	2.37	2.52	2.67	2.74	2.75	2.72	1.90
NORTHERN AFRICA	65	83	94	109	126	144	186	296	2.33	2.51	2.88	2.87	2.77	2.62	2.44	1.47
SOUTHERN AFRICA	20	25	29	33	38	44	58	101	2.43	2.61	2.76	2.87	2.87	2.82	2.71	1.76
WESTERN AFRICA	79	104	121	141	166	195	267	505	2.77	2.99	3.06	3.18	3.23	3.20	3.13	2.02
LATIN AMERICA	216	284	323	366	415	468	587	937	2.82	2.56	2.51	2.50	2.43	2.32	2.21	1.61
CARIBBEAN	20	25	28	31	34	37	44	62	2.27	2.07	1.93	1.94	1.79	1.70	1.63	1.19
MIDDLE AMERICA	49	67	79	93	109	128	172	303	3.25	3.19	3.25	3.26	3.18	3.04	2.91	1.82
TEMP.SO.AMERICA	31	36	38	41	44	47	52	62	1.66	1.33	1.33	1.29	1.20	1.09	0.99	0.55
TROP.SO.AMERICA	116	156	178	201	228	257	320	599	3.03	2.64	2.52	2.47	2.39	2.26	2.13	1.67
NORTHERN AMERICA	199	226	236	248	261	275	301	331	1.49	0.86	0.94	1.07	0.99	1.07	0.72	0.23
EAST ASIA	816	991	1096	1175	1250	1327	1475	1712	1.94	2.02	1.38	1.24	1.19	1.09	1.02	0.38
CHINA	682	836	928	995	1060	1128	1257	1469	2.02	2.09	1.40	1.27	1.24	1.13	1.05	0.39
JAPAN	94	104	112	117	120	123	129	131	0.99	1.33	0.88	0.62	0.49	0.48	0.49	-0.07
OTHER EAST ASIA	40	51	57	63	70	76	88	111	2.78	2.20	2.05	1.92	1.76	1.55	1.35	0.69
SOUTH ASIA	873	1111	1257	1406	1566	1733	2077	2823	2.39	2.30	2.23	2.17	2.02	1.90	1.72	0.95
EASTERN SO.ASIA	229	291	326	363	402	442	523	692	2.41	2.31	2.13	2.04	1.90	1.77	1.58	0.88
MIDDLE SO.ASIA	588	747	845	944	1051	1160	1386	1867	2.35	2.35	2.21	2.14	1.98	1.87	1.70	0.90
WESTERN SO.ASIA	56	74	85	98	114	131	168	264	2.76	2.92	2.85	2.89	2.78	2.63	2.42	1.47
EUROPE	425	459	474	484	492	499	512	522	0.91	0.63	0.40	0.34	0.30	0.27	0.24	0.03
EASTERN EUROPE	97	103	106	110	113	116	121	131	0.68	0.55	0.71	0.61	0.49	0.43	0.43	0.23
NORTHERN EUROPE	76	80	82	82	82	82	83	81	0.71	0.31	0.10	0.04	0.03	0.05	0.02	-0.10
SOUTHERN EUROPE	118	128	134	139	143	147	154	161	0.87	0.98	0.72	0.61	0.53	0.46	0.40	0.12
WESTERN EUROPE	135	148	152	153	153	154	155	150	1.23	0.56	0.05	0.04	0.07	0.00	0.05	-0.12
OCEANIA	16	19	21	23	25	26	30	36	2.09	1.81	1.47	1.44	1.36	1.29	1.19	0.61
AUST.-N.ZEALAND	13	15	17	18	19	20	22	25	1.99	1.68	1.21	1.15	1.05	0.99	0.93	0.36
MELANESIA	2	3	3	4	4	5	6	9	2.31	2.43	2.70	2.72	2.63	2.46	2.18	1.37
MICRO.-POLY.	1	1	1	1	2	2	2	2	2.84	2.11	1.73	1.66	1.52	1.30	1.10	0.34
U.S.S.R.	214	244	254	267	280	292	312	357	1.49	0.85	0.94	0.94	0.85	0.70	0.64	0.50

Source: The same as table 1.1

D. Population projections

The increasing size of the net annual increase to the world's population especially in the less developed regions has significant implications for the development issues outlined in the United Nations New Development Strategy and the New Economic Order for the 1980s and beyond. On the other hand, in the more developed regions, many countries are going to face new challenges which will be caused by very slow, if not negative, population growth accompanied by the further aging of the population.

In order to assist national and international actions and planning for the future, the United Nations demographic projections have been revised in 1980 by taking into account all the latest available data. Preliminary results of this exercise show that the world population of 4.4 billion in 1980 will likely increase to 6.1 billion by 2000 and 8.3 billion by 2025. Since demographic projections are computed on the basis of assumptions about uncertain future trends of fertility, mortality and migration rates, the high and the low variants of projections are prepared in addition to the medium variant quoted above. These variants are intended to present plausible but not exhaustive ranges within which future population would likely grow. According to preliminary results, the low and the high variants respectively put the world population at between 5.9 and 6.4 billion for 2000, and between 7.2 and 9.2 billion for 2025 (see table 1.3).

The significant differences among these projections reflect the volatile state of current and future demographic trends. Depending on the extent of success in social and economic development efforts, population policies, technological innovations and other factors which should affect demographic rates directly and indirectly, future population could follow quite different paths having quite different social and economic implications. The medium and low variant projections assume a declining trend in the rate of future population increase, while the high variant envisages a pratically constant, if not higher, rate of increase through the end of this century. In terms of the size of this increase, however, the medium and the high variants foresee ever growing net annual additions throughout the current century which will reach 90 to 100 million per year by 2000 up from a 1975-1980 level of 70 million. Only the low variant predicts a more or less constant absolute annual increase in the coming two decades. In the first quarter of the 21st century, projections are more diverse and anticipate that the size of average annual increases will range from 120 million in the high variant to 40 million in the low variant while the medium variant is put at 80 million per year.

Due to the gap in the curent growth rate between the more developed and the less developed regions, most future population growth is projected to occur in the latter regions. The less developed regions with an average

Table 1.3 World population trends and prospects in three variants of projections, 1950-2025

Year	Medium Variant		High Variant		Low Variant	
	Population (million)	Rate of a/ change (%)	Population (million)	Rate of a/ change (%)	Population (million)	Rate of a/ change (%)
1975	4,069	1.93	4,069	...	4,069	...
1980	4,437	1.73	4,445	1.77	4,424	1.68
1985	4,835	1.72	4,874	1.84	4,785	1.57
1990	5,255	1.67	5,341	1.83	5,147	1.46
1995	5,697	1.61	5,844	1.80	5,507	1.35
2000	6,146	1.52	6,367	1.71	5,853	1.22
2005	6,592	1.40	6,908	1.63	6,174	1.07
2010	7,029	1.28	7,467	1.56	6,466	0.93
2015	7,456	1.18	8,047	1.49	6,731	0.80
2020	7,870	1.08	8,640	1.42	6,972	0.70
2025	8,259	0.97	9,242	1.35	7,189	0.62

a/ Rate of change is the average annual rate of population change during the five-year period since the preceding date and computed as an exponential rate.

Source: The same as table 1.

current growth rate of 2.1 per cent are projected to continue to grow quite rapidly, at a rate of 1.8 per cent in 1995-2000 and of 1.1 per cent in 2020-2025. The more developed regions, on the other hand, are projected to experience a reduced growth rate from the current 0.7 to 0.5 per cent per annum in 1995-2000 and 0.2 per cent in 2020-2025. Concomitantly, the population residing in the currently less developed regions will increase from 74 per cent of the world's population in 1980 to 79 per cent in 2000 and 83 per cent in 2025.

Among the less developed regions, Africa is projected to maintain the highest rate of population increase throughout the projection span: 2.9 per cent at the end of this century and 1.9 per cent in 2020-2025. Here the population will increase from the current size of 470 million to 850 million or by 80 per cent by the year 2000 and it will more than triple by 2025, attaining a size of over 1,500 million. Latin America is likely to have a faster pace of decline in growth rate than Africa: the current rate of 2.5 per cent per annum in Latin America is projected to decline to 2.3 per cent by 2000 and 1.6 per cent by 2025. The population for Latin America is projected to be 590 million in 2000 and 940 million in 2025; these values are greater than the current 370 million by 60 per cent and 150 per cent respectively.

On the other hand, Asia defined as all the countries from the Middle East through the Far East (excluding Asian portions of USSR and Oceania), holds 2,600 million in 1980 and comprises 58 per cent of the world total. This population is now projected to grow to 3,600 million in 2000 and 4,500 million in 2025. The absolute size of the increase 1,000 million in the coming 20 years, appears to be overwhelming but the percentage rates of increase are rather modest. However, East Asia which includes China, Japan, Korea, Mongolia and Hong Kong has already achieved a modest growth rate of about 1.3 per cent per annum and the rate is projected to decrease below 1.0 per cent by 2000 and 0.4 per cent by 2025. In contrast, South Asia which has 1,400 million population in 1980 is currently growing quite rapidly at a rate of 2.2 per cent. The rate is projected to decline to 1.6 per cent by 2000 and 0.9 per cent by 2025 but South Asia's population will likely double by 2025 anyway.

Meantime, population growth in Northern America, Europe and USSR is projected to remain at or below the current modest rate throughout the projection span. Thus, for the more developed regions as a whole, including Australia, Japan and New Zealand, population is projected to grow from 1,100 million in 1980 to 1,300 million in 2000 and 1,400 million in 2025. Consequently, the distribution of the global population by broad geographical areas will significantly change in favour of Africa, Latin America and South Asia. More specifically by 2025 these areas will contribute to the world total: 19, 11 and 34 per cent respectively. These shares are larger than their 1980 shares, by 11, 8 and 3 points respectively. Conversely, East Asia and the rest of the world will contribute a reduced share of the world's total population.

Chapter 2

CONDITIONS AND RECENT TRENDS OF FERTILITY

A. Levels and Recent Trends

World summary

Levels of fertility continue to vary enormously across countries with the variations being almost as large within the developing world as between the developing and developed countries. Cross-country comparisons of fertility show substantial variations even within countries at similar levels of development. In general, it can be said that African fertility remains the highest worldwide. In Asia and Latin America, overall fertility levels are lower and in addition, there is a much greater spread of levels within these two regions. Among the developed countries, fertility levels are consistently low with the large majority recording total fertility rates in the mid-1970's which fall well below levels required to sustain population replacement for the future.

Despite increasingly prevalent reports of dramatic fertility declines throughout the developing world, [1] there exists little undisputable evidence to date of such declines among many of the more populous developing countries. Unfortunately, analysis of levels and trends in fertility is hampered by the paucity of fertility data currently available which is based on complete birth registration statistics. In general the trend in fertility has been down over the course of the 1970's for almost all the developing countries for which comparable data over time are available. In many of the other (often substantially more populous) countries, this may also be the case but present estimates based on sample surveys and other incomplete methods do not permit precise intertemporal comparisons. Nonetheless, the picture presented in this report is one of lower estimated fertility levels, most notably for some of the more populated countries of Asia. Whether there have actually been decreases of the magnitude indicated for some countries is uncertain; in some cases, the changes may reflect improved estimation of relatively stable fertility levels.

With the exception of the USSR and most of Eastern Europe, the trend in fertility among the developed countries has been down during the 1970's. Because of divergent trends between Eastern and Western Europe, Eastern Europe is now experiencing, on average, levels of fertility slightly above those prevailing in Western and Northern Europe as well as those in North America.

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[1] See for example Amy Ong Tsui and Donald T. Bogue, "Declining world feritlity: trends, causes and implications", Population Bulletin, (Population Reference Bureau), vol. 33(4), October 1978.

Africa

Africa continues to represent the last frontier for demographers who monitor levels and trends in fertility around the world. Although within the next two years new estimates of fertility for the late 1970's are anticipated for nine African countries currently conducting World Fertility Surveys, 2/ these estimates were not available for this report. Only 5 of the 48 African countries have relatively complete birth registration statistics -- 3 North African Arab countries (Algeria, Egypt and Tunisia) and 2 tiny islands in East Africa (Mauritius and Réunion) -- no one of which typifies in any way the demographics of the vast bulk of the African continent.

Table 2.1 presents the most recent reliable estimates of crude birth rates for each of the African countries as well as an estimated total fertility rate when available. These estimates are based on a variety of sources and methods. Only 17 of the 48 countries have estimates based on data from the 1970's, 5 more than in the last monitoring report.

The picture of fertility levels in Africa remains remarkably unchanged despite more recent estimates for eleven countries. Crude birth rate estimates range from a high of 53 per 1000 population in Niger to 25.7 per 1000 population in Réunion with only 15 of the African countries recording crude birth rate estimates below 45 per 1000 population. Estimates of the total fertility rate range from a high of 8.1 in Kenya to a low of 3.0 in Mauritius with only 13 out of 40 countries for which such data are available, recording a total fertility rate below 6.

The regions of Eastern and Western Africa show on the whole the highest levels of fertility worldwide. Moderate to high fertility is also characteristic of the rest of Africa with only 9 countries in all recording crude birth rates of 40 per 1000 population or below: Mauritius, Réunion, Congo, Equatorial Guinea, Gabon, Egypt and Tunisia, Gambia and Guinea-Bissau. Of these, Egypt is the most important in terms of population size. The reasons for the unusually low fertility in relative terms, estimated for the Congo, Equatorial Guinea, Gabon, Gambia and Guinea-Bissau of Western and Middle Africa are still unknown, though it is generally thought that health and nutrition, among other things, have contributed to a comparatively wide prevalence of sub-fecundity.

2/ The African countries with surveys completed or in progress as of 30 June 1980 were Cameroon, Egypt, Ghana, Ivory Coast, Kenya, Lesotho, Morocco, Senegal, Sudan and Tunisia. "World Fertility Survey, WFS Surveys in Developing Countries. Current Status", (WFS/TECH.1460, 30 June 1980, stenciled).

Table 2.1 Estimates of fertility measures in countries of Africa, Latin America and Asia for specific years

Region and country	Year or period	Method of estimation	Crude birth rate (per 1,000 population)	Total fertility rate
AFRICA				
Eastern Africa				
Burundi	1970-71 a/	B	42	6.0
Comoros	1966	C(4)	47	6.1
Ethiopia	1972 b/	C(4)	51	...
Kenya	1977-78 c/	B	48.7	8.1
Madagascar	1966	C(3)	49	7.1
Malawi	1970-72 d/	C(4)	50.5	...
Mauritius	1978	A	27.2	3.0 e/
Mozambique	1960	C(4)	43	5.5
Réunion	1977	A	*25.7	...
Rwanda	1970 f/	C(4)	51.0	...
Somalia	1965	C(4)	47	6.5
Southern Rhodesia	1969	C(4)	48	6.7
Uganda	1969	C(4)	46	6.1
United Rep of Tanzania	1973 g/	B	47	6.5
Zambia	1969 h/	C(4)	50	7.1
Middle Africa				
Angola	1972 b/	C(4)	50	...
Central African Rep.	1959-60 i/	C(3)	45	5.1
Chad	1963-64	C(3)	48	5.3
Congo	1960-61	C(3)	44	5.7
Equatorial Guinea	1965	C(4)	35	5.0
Gabon	1960-61	C(3)	31	4.1
United Rep. of Cameroon	1972 b/	C(3)	39	...
Zaire j/	1975-76	C(4)	44.6	6.6
Northern Africa				
Algeria	1975	A	47.8	...
Egypt	1978	A	37.6	...
Libyan Arab Jamahiriya	1964	C(4)	47	6.5
Morocco	1973 k/	B	47.7	7.4
Sudan	1955-56	C(4)	49	6.9
Tunisia	1976	A	36.4	5.8

Table 2.1 (cont'd)

Region and country	Year or period	Method of estimation	Crude birth rate (per 1,000 population)	Total fertility rate
Southern Africa [1]				
Botswana	1971	C(4)	44	7.2
Lesotho	1966	C(4)	38	5.0
Namibia	1960	C(4)	45	6.0
Swaziland	1966	C(4)	50	6.5
Western Africa				
Benin	1961	C(3)	50	6.7
Gambia	1963	C(4)	40	5.3
Ghana	1967-69 [m]	C(3)	48	7.0
Guinea	1954-55	C(3)	48	6.0
Guinea-Bissau	1965	C(4)	40	5.3
Ivory Coast	1957-58	C(3)	52	6.0
Liberia	1970 [n]	B	51	6.5
Mali	1960-61	C(3)	50	6.7
Mauritania	1964-65	C(4)	45	5.9
Niger	1959-60	C(3)	53	7.0
Nigeria	1963	C(4)	50	6.7
Senegal	1960-61	C(4)	49	6.5
Sierra Leone	1963	C(4)	45	5.9
Togo	1961	C(3)	50	6.5
Upper Volta	1969 [o]	C(3)	49	6.5
LATIN AMERICA				
Caribbean				
Cuba	1970-75 [p]	C	25.8	2.5
Dominican Republic	1970-75 [p]	C	42.0	5.0
Guadeloupe	1975 [q]	A	24.8	...
Haiti	1970-75 [p]	C	42.7	5.9
Jamaica	1976 [r]	A	29.3	3.7
Martinique	1975 [q]	A	20.4	...
Puerto Rico	1978	A	22.8	...
Trinidad and Tobago	1978	A	25.3	...

Region and country	Year or period	Method of estimation	Crude birth rate (per 1,000 population)	Total fertility rate
Middle America				
Costa Rica	1974 s/	A	29	3.9
El Salvador	1977	A	41.7	...
Guatemala	1973 t/	A	41.5	5.7
Honduras	1974 u/	B	48	7.2
Mexico	1977-78 v/	A	37.0	5.2
Nicaragua	1970-75 p/	C	48.3	6.5
Panama	1978	A	28.2	...
Temperate South America				
Argentina	1970	A	22.9	...
Chile w/	1975	A	24	3.0
Uruguay	1976	A	21.2	...
Tropical South America				
Bolivia	1970-75 p/	C	46.0	6.5
Brazil	1970-75 p/	C	37.1	5.0
Colombia	1976 x/	B	31.1	4.2
Ecuador	1970-75 p/	C	42.2	6.4
Guyana	1975 y/	B	...	4.4
Paraguay	1970-75 p/	C	39.8	6.0
Peru	1970-75 p/	C	41.0	6.0
Surinam z/	1970-75 p/	C	41.6	5.5
Venezuela	1970-75 p/	C	36.2	4.9
EAST ASIA				
China	1978 aa/	D	18.3	...
Japan	1977	A	15.5	1.8
Other East Asia				
Hong Kong	1978	A	*17.5	...
Korea				
Korea, Democratic Peoples Rep. of	1972	C(6)	44.0	...
Korea, Rep. of	1975 bb/	A	26.0	3.6
Mongolia	1972	C(6)	40.0	...

Table 2.1 (cont'd)

Region and country	Year or period	Method of estimation	Crude birth rate (per 1,000 population)	Total fertility rate
SOUTH ASIA				
Eastern South Asia				
Burma	1972	C(6)	40.0	...
Democratic Kampuchea	1957-62 cc/	C(5)	45.9	7.2
East Timor	1970	A	43.0	
Indonesia dd/	1976 ee/	B	34.0	4.5
Lao Peoples's Democratic Rep.	1972	C(6)	42.0	...
Malaysia	1972	C(6)	38.0	...
Peninsular Malaysia	1977	A	*30.7	...
Sabah and Sarawak		D	...	...
Philippines	1977 ff/	B	...	5.0
Singapore	1978	A	17.0	...
Thailand	1974-75 gg/	B	37.0	5.1
Viet Nam hh/	1973	D	42.0	6.7
Middle South Asia				
Afghanistan	1972-73 ii/	C(6)	50.0-53.0	7.7
Bangladesh	1971-75 jj/	B	...	6.3
Bhutan	1972	C(6)	47.0	...
India	1975 kk/	B	35.2	...
Iran	1975-76 ll/	C(4)	42.7	6.7
Nepal	1974-75 mm/	B	44.0	6.5
Pakistan	1975-76 nn/	B	40.5	6.3
Sri Lanka	1974 oo/	B	...	3.4
Western South Asia				
Arab countries				
Bahrain	1971 pp/	C(4)	41.2	7.0
Iraq	1965 qq/	C(4)	49.5	7.2
Jordan	1972 rr/	B	45.0	7.7
Kuwait	1969-71 pp/	C(4)	47.0	7.0
Lebanon	1970 ss/	B	34.4	5.5
Oman	1972	C(6)	50.0	...
Saudi Arabia	1972	C(6)	50.0	...
Syrian Arab Republic	1970 tt/	C(4)	47.8	7.5
Yemen	1972 pp/	D	50.0	6.9
Yemen, Democratic	1972 pp/	C(6)	50.0	...
Non-Arab countries				
Cyprus	1978	A	19.3	...
Israel	1978	A	*25.2	...
Turkey	1967 uu/	B	39.6	...

Table 2.1 (cont'd)

... Data not available.

* Provisional

a/ Republique due Burundi, Ministere du Plan, Dept. des Statistiques, Enquête Demographique 1970-71, Tome II, Demographic-Methodologic-Annexes-1974, pp. 107 and 110.

b/ Jacques Veron, "Niveaux Nationax de la Natalití et Politiques de limitation des naissances", Population (Paris 31e année, numéro 6, Novembre-Décembre 1976), p. 1242.

c/ Kenya Central Bureau of Statistics, Ministry of Economic Planning and Community Affairs, Kenya Fertility Survey, Major Highlights, , (a preliminary report prepared for the World Fertility Survey meeting held in Kenya, 27-29 August 1979), Table 10, p. 31.

d/ Based on the results of the Population Survey of 1970-72.

e/ In 1977.

f/ Based on results of the 1970 sample survey, covering 100,000 persons.

g/ United Republic of Tanzania, 1973 National Demographic Survey of Tanzania, Vol. VI, An Analysis of the 1973 Demographic Survey of Tanzania, 1977, Table 5.15, p. 91 and p. 92.

h/ Patrick O. Ohadike and Habtemariam Tesfaghiorghis, The Population of Zambia, 1974 World Population Year, C.I.C.R.E.D. 1975, p. 43.

i/ Survey data exclude the populations of Bangui, Zone East and nomad population (Bororos, Babugas). See Enquête Démographique en République Centrafricaine 1959-1960 - Résultats definitifs - le présent rapport a étí rédigí par Marcel Lafarge, attaché de l'I.N.S.E.E., Expert - Statisticien du Ministíre de la Cooperation.

j/ In West Zaire only. See Dominique Tabutin, "Fecondite et Mortalite dans l'Quest du Zaire", Working Paper no. 7, Juin 1979, papúr sollecité par le "Panel sur l'Afrique Tropicale" du Comité sur la Population et la Démographie de l'Académic Nationale des Sciences de Etats - Unis - Reunion de Yaoundé (7-9 Août 1979), Tableau 1, p. 7.

k/ Royanne du Maroc, Direction de la Statistique, Centre de Recherches et d'etudes demographiques, La fecondite marocaine, No. 6 (Octobre 1974), Tableau 8, p. 11.

l/ Not including South Africa because no data are available for the major ethnic group.

m/ U.S. Department of Commerce, Bureau of the Census, Country Demographic Profiles: Ghana (September 1977), table 7.

n/ Republic of Liberia, Department of Planning and Economic Affairs, Demographic Annual of the Population Growth Survey 1970; patterns of natality, Series N-1 (Monrovia, August 1971), table (a).

o/ D.Ian Pool and S.P. Coulibaly, edited Demographic Transition and Cultural Continuity in the Sahel (Ithaca, New York, 1977), p. 11 and table 1.2 on p. 33.

p/ Data provided by Centro Latinoamericano de Demografica.

q/ Henri Leridon, "La situation démographique des departments francais d'outre-mer," Population (Paris, 31^e année, numero 6, novembre-decembre, 1976), p. 1250.

r/ Jamaica, Department of Statistics, World Fertility Survey, Jamaica Fertility Survey 1975/76, Country Report, vol. I (Kingston, Jamaica, 1979), table 1.3, p. 3 and table 3.2.v, p. 63.

s/ U.S. Department of Commerce, Bureau of the Census, Country Demographic Profiles: Costa Rica, ISP-DP-4 (August 1977), table 3 and 7.

t/ U.S. Department of Commerce, Bureau of the Census, Country Demographic Profiles: Guatemala, ISP-DP-6 (October 1977), table 3 and 7.

u/ U.S. Department of Commerce, Bureau of the Census, Country Demographic Profiles: Honduras, ISP-DP-10, Decembre 1977, table 3 and 7 on pages 5 and 8.

v/ U.S. Department of Commerce, Bureau of the Census, Country Demographic Profiles: Mexico, ISP-DP-14, (September 1979), table 3 and 7, pp. 6 and 9.

w/ U.S. Department of Commerce, Bureau of the Census, Country Demographic Profile: Chile, ISP-DP-13, (February 1978), tables 3 and 7 on pages 5 and 8.

x/ Republic of Colombia, Corporación Centro Regionale de Poblacion, Encuesta Nacional de Fecundidad Colombia 1976. Resultados Generales (Bogota, 1977).

y/ Guyana, Ministry of Economic Development Statistical Bureau, World Fertility Survey, Guyana Fertility Survey, 1975, Country Report, vol. I, (1979), table 3.2.z, p. 48.

z/ Excluding Indian and Negro population living in tribes.

Table 2.1 (cont'd)

aa/ Chen Muhua, "Birth Planning in China", International Family Planning Perspectives, vol. 5, no. 3, (New York, September 1979), p. 92.

bb/ For 1974, crude birth rate of 26.0 has been calculated on the basis of data given in Korea, Korea Institute for Family Planning, National Bureau of Statistics of the Economic Planning Board, World Fertility Survey 1974, First Country Report, (Seoul, 1977) table II.1B and table 39; for total fertility rate see table 39, p. 89.

cc/ George S. Siampos, "The population of Cambodia, 1945-1980", The Milbank Memorial Fund Quarterly, vol. XLVIII, no. 3 (July 1970), p. 336.

dd/ Including West Irian.

ee/ Jeanne Cairns Sinquefield and Bambang Sungkono, "Fertility and Family Trends in Java and Bali", International Family Planning Perspectives, vol. 5, no. 2 (June 1979), tables 1 and 2, pp. 45 and 46.

ff/ Philippines National Census and Statistics Office, University of the Philippines Population Institute, Commission on Population, National Economic and Development Authority, World Fertility Survey, Republic of the Philippines Fertility Survey, 1978, First Report, (December 1979), table 5.12, p. 102.

gg/ Fred Arnold, Robert O. Retherford, and Anuri Wanglee, The Demographic Situation in Thailand, papers of the East-West Population Institute, no. 45 (Honolulu, Hawaii, East-West Center, 1977), table 9. See also Institute of Population Studies Chulalongkorn University and Population Survey Division National Statistical Office, The Survey of Fertility in Thailand: Country Report no.1, vol. I, (Bangkok, Thailand, 1977), table 22, p. 56.

hh/ Data for former Democratic Republic of Viet Nam. See Trng-Minh-Cac and NGO Yeh-Tuan-Phong, "Viet-Nam (South)-East Asia Review, 1973", Studies in Family Planning, vol. 5, no. 5, (May 1974), p. 172.

ii/ James F. Spitter and Nancy B. Frank, Afghanistan: A Demographic Uncertainty, paper prepared for presentation at the Population Association of America, St. Louis, Missouri, April 21-23, 1977, International Statistical Program Center, U.S. Bureau of the Census, Washington, D.C., p. 9.

jj/ People's Republic of Bangladesh, Ministry of Health and Population Control and Family Planning Division, World Fertility Survey, Bangladesh Fertility Survey, 1975 - First Report,(December 1978), table 6.10, p. 73.

kk/ Registrar General, India, Ministry of Home Affairs, Sample Registration Bulletin, vol. XI, no. 1, New Delhi, India, January 1978, p. 2.

ll/ Habibollah Zandjani, "Evolution de la population Iranienne à travers les recensements", in notes et documents, Population (Paris, 32^{e} annee, numéro 6, Novembre-Décembre 1977), p. 1281.

mm/ World Fertility Survey, Nepal Fertility Survey, 1976, A Summary of Findings, No. 5 (The Hague, London, April 1978), p. 6.

nn/ Pakistan, Population Planning Council of Pakistan, World Fertility Survey, Pakistan Fertility Survey First Report, (October 1976), p. 75.

oo/ Sri Lanka, Ministry of Plan Implementation, Department of Census and Statistics, World Fertility Survey, Sri Lanka, 1975 - First Report, (March 1978), table 5.13, p. 98.

pp/ Youssef Courbage and Philippe Fargues, "La population des pays arabes d'Orient", Population, (Paris, 30^{e} année, numéro 6, Novembre-Décembre 1975), tableau VII., p. 1123.

qq/ K. C. Zachariah and Wided Hamoredi, "Use of census data for estimating demographic measures of Iraq", in Cairo Demographic Centre, Demographic Measures and Population Growth in Arab Countries, Research Monograph Series, No. 1 (Cairo, 1970), p. 46. See also Youssef Courbage and Philippe Faragues, "La population des pays arabes d'Orient", Population, (Paris), 30^{e} année, numéro 6, Novembre-Decembre 1975) tableau VII, p. 1123.

rr/ Jordan, Department of Statistics, Draft Final Report of National Seminar on Population Policy as Related to Development Strategy, 2-7 December 1972, (Amman, 1972), P. 1.

ss/ Youssef Courbage and Philippe Fargues, La situation demographique au Liban, I. Mortalité, fécondité et projection: méthodes et résultats (Beirut, Université Libanaise, 1973), p. 36, table II. See also Youssef Courbage and Philippe Fargues, "La population des pays arabes d'Orient", Population, (Paris, 30^{e} année, numéro 6, Novembre-Décembre 1975), tableau VII, p. 1123.

tt/ Syrian Arab Republic, Office of the Prime Minister, Central Bureau of Statistics, Statistical Abstract, 1977 (1977), p. 92, see also Mouna Liliane Samman, "La Situatión Démographique de la Syrie", Population (Paris, 31^{e} année, numéro 6, Novembre-Décembre 1976), tableau 17, p. 1276.

uu/ Based on results of the Turkish Demographic Survey.

Table 2.1 (continued)

Method of Estimation:

A.- "Complete" birth registration statistics;

B - Birth data from sample survey;

C - Other estimates, including estimates whose basis cannot be clearly determined from available information;

(1) "reverse survival" method;
(2) on number of children reported as having been born to each woman during her lifetime;
(3) on reported births occurring during the 12-month period before a survey or census and the number of children ever born, both by age of mother;
(4) on the analysis of the age composition of the population, supplemented by indications of the rate of natural increase or of an approximate level of mortality;
(5) on number of reported births by age of mother in the year preceding the census, adjusted by graphic technique;
(6) basis either unknown or cannot be clearly determined for available information;

D - Either no data available or birth registration statistics so deficient as to be useless for identifying trend.

Trends since 1970 can be discerned for only a very few countries with relatively good statistics. From tables 2.2 and 2.3 it can be seen that fertility was continuing to decline in Mauritius in 1977. A preliminary estimate for the crude birth rate for 1978 shows a substantial increase over 1977 but previous trends in the total fertility rate suggest that this may not represent a real increase in fertility. A provisional birth rate for 1977 in Réunion suggests fertility is continuing its decline there, as well. Also in Tunisia, both the crude birth rate and the total fertility rate show further declines in 1976. On the other hand, provisional crude birth rate figures for Egypt give no evidence of recent fertility declines. While both Tunisia and Egypt have a substantial government investment in family planning, Tunisia's programme has been particularly aggressive in recent years. 3/

Latin America

For all Latin American countries, crude birth rate estimates are available for the 1970's. Of the 27 Latin American countries for which data are shown in table 2.1, 13 or roughly 50 per cent have fertility estimates based on complete birth registration statistics. Overall, Latin American fertility is lower than in Africa and most of Asia with 11 out of 26 countries for which crude birth rates are available showing measures below 30 per 1000 population, the level traditionally used to distinguish the developing from the developed countries. Crude birth rates range from 20.4 in Martinique to 48.3 in Nicaragua and total fertility rates vary in level from 2.5 in Cuba to 7.2 in Honduras.

The overall level of fertility in Latin America does not appear to have changed notably despite new data for eleven countries. With the exception of the island containing Haiti and the Dominican Republic, all the countries of the Caribbean now show crude birth rates well below 30 per 1000. The countries of Middle and Tropical America have significantly higher fertility on average than the rest of the continent with Costa Rica the only country in this group showing a crude birth rate below 30 per 1000 population and a total fertility rate below 4. And, if anything, new fertility estimates for the countries of these two sub-regions show slightly higher levels of fertility than those presented in the previous monitoring report. The countries of Temporate South America show the lowest average fertility levels in the entire region.

3/ Dorothy Nortman and Ellen Hofstatter, Population and Family Planning Program (Ninth Edition) A Population Council Fact Book. 1978, p. 19.

Because of better data, it is possible to learn something about fertility trends in some of these countries. Although the total fertility rates presented in table 2.3 add little to the story already told by the gross reproduction rates presented in the previous monitoring report, some trends in the crude birth rates presented in table 2.2 are worthy of note. With the exception of Puerto Rico and Trinidad and Tobago, the Caribbean region shows continuing declines in crude birth rates with Jamaica provisionally recording a particularly precipitus drop in 1978, implying a 38 per cent decline since 1970. Of the Tropical and Middle American countries, 3 have recorded notable declines in their crude birth rates. Since 1970, the percentage declines (1970-78) have amounted to 19 per cent for Mexico, 24 per cent for Panama and 15 per cent for Guyana. The course of fertility decline in Mexico is of particular interest because of its large population and its recently announced Regional Demographic Policy 4/ but any assessment of fertility trends for Mexico on the basis of crude birth rate data alone would seem hazardous in the absence of reasonably reliable data on the age composition of women in the reproductive ages and on age at marriage (including consensual marriage) during recent years. In the case of Jamaica and Panama, however, the sharp declines in crude birth rates coincide with sharp fertility declines as evidenced by changes in the total fertility rate from 1970-1976.

Asia

Asia is not only the most populous of the world's developing regions but also one of the most heterogeneous from a demographic perspective. Of the 38 countries included in this region, only 8 have fertility data based on complete birth registration statistics and these countries include only roughly 13 per cent of the total Asian population. However, with the exceptions of Democratic Kampuchea, Iraq, and Turkey, the estimates of fertility levels presented in table 2.1 represent data collected in the decade of the 70's.

Since the last monitoring report, new updated estimates of fertility levels have become available for 10 countries 5/ which, together, represent roughly 56 per cent of the total Asian population. Although the sources and methods of estimation are subject to questions of interpretation in most cases, these new estimates present a picture of substantially lower levels of fertility than previously presented. Excluding Japan, a developed country, the estimates of crude birth rates range from a high of 50-53 per 1000 population in Afghanistan to a low of 17.0 per 1000 population in Singapore,

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4/ United Nations Population Division/UNFPA, Population Policy Compendium, Mexico (January, 1979).

5/ China, Japan, Hong Kong, Indonesia, Peninsular Malaysia, Philippines, Singapore, Bangladesh, Nepal and Sri Lanka.

Table 2.2. Crude birth rates and index numbers for more developed countries and selected less developed countries with relatively good statistics, 1970-1978

Region and country	Crude birth rate (per 1000 population)					Index (1970=100)				
	1970	1975	1976	1977	1978	1970	1975	1976	1977	1978
ca										
stern Africa										
Mauritius a/	26.8	25.1	25.7	25.8	*27.2	100	96	102	102	101
Réunion	30.2	28.0	26.8	*25.7	...	100	93	89	85	...
rthern Africa										
Egypt	34.8	37.7	...	*37.7	*37.6	100	108	...	108	108
Tunisia	36.4	36.6	36.4	...	...	100	100	100	...	...
n America										
ribbean										
Cuba	*27.7	*20.7	*19.8	*17.6	...	100	75	71	64	...
Guadaloupe	28.7	...	...	*19.3	*17.2	100	...	...	67	60
Jamaica	34.4	30.1	29.8	...	*21.3	100	87	86	...	62
Martinique	27.5	...	...	*16.7	*15.5	100	...	...	61	56
Puerto Rico	24.8	22.4	22.6	22.6	*22.8	100	90	91	91	92
Trinidad and Tobago	24.4	23.7	24.7	*24.2	*25.3	100	97	101	99	104
ddle America										
Costa Rica	33.4	29.5	29.7	31.1	...	100	88	89	93	...
El Salvador	40.0	39.9	40.2	*41.7	...	100	100	100	104	...
Guatemala	40.3	41.0	42.6	...	...	100	102	106	...	...
Mexico	42.2	37.5	34.6	35.3	34.0	100	89	82	84	81
Panama	37.1	32.3	*32.2	*28.8	*28.2	100	87	87	78	76

Table 2.2 (cont'd)

Region and country	Crude birth rate (per 1000 population)					Index (1970=100)				
	1970	1975	1976	1977	1978	1970	1975	1976	1977	1978
Temperate South America										
Argentina	22.9	...	...	...	...	100	...	...	...	...
Chile	26.8	25.0	21.9	20.3	22.3	100	93	82	76	83
Uruguay	19.0	21.1	21.2	...	...	100	111	112	...	...
Tropical South America										
Guyana	33.4	...	*26.9	...	*28.3	100	...	79	...	85
Surinam	...	...	...	...	...	...	...	...	...	...
Venezuela	38.2	37.2	*36.4	36.6	...	100	97	95	96	...
Northern America										
Canada	17.4	15.7	15.6	15.5	15.2	100	90	90	89	87
United States	18.3	14.8	14.8	15.3	15.3	100	81	81	84	84
Asia										
East Asia										
Japan	18.8	17.2	16.3	15.5	...	100	91	87	82	...
Other East Asia										
Hong Kong	20.0	18.1	17.2	17.5	17.5	100	91	86	88	88
South Asia										
Eastern South Asia										
Malaysia b/	34.0	31.3	31.7	*30.7	...	100	92	93	90	...
Singapore	22.1	17.8	18.8	16.6	*17.0	100	80	85	75	77

Table 2.2 (cont'd)

Region and country	Crude birth rate (per 1000 population)					Index (1970=100)				
	1970	1975	1976	1977	1978	1970	1975	1976	1977	1978
Middle South Asia										
Sri Lanka	29.4	...	...	...	...	100	...	...	...	...
Western South Asia										
Non-Arab Countries										
Cyprus	19.5	16.0	18.7	18.4	19.3	100	82	96	94	99
Israel c/	27.2	27.7	28.0	26.4	25.2	100	102	103	97	93
Europe										
Eastern Europe										
Bulgaria	16.3	16.6	16.5	*16.1	*15.5	100	102	101	98	95
Czechoslovakia	15.9	19.6	19.2	18.7	*18.4	100	123	121	118	115
German Demcratic Republic d/	13.9	10.8	11.6	13.3	13.9	100	78	84	96	100
Hungary	14.7	18.4	17.5	16.7	15.7	100	125	119	114	107
Poland	16.8	18.9	19.5	19.1	*19.0	100	113	116	114	113
Romania	21.1	19.7	19.5	19.6	...	100	93	92	93	...

Table 2.2 (cont'd)

Region and country	Crude birth rate (per 1000 population) 1970	1975	1976	1977	1978	Index (1970=100) 1970	1975	1976	1977	1978
Northern Europe										
Denmark e/	14.4	14.2	12.9	*12.2	*12.2	100	99	90	85	85
Finland	14.0	13.9	14.1	13.9	*13.5	100	100	101	99	96
Ireland	21.7	21.5	*21.6	*21.4	*21.7	100	99	99	99	100
Norway	16.6	14.1	13.3	12.5	*12.7	100	85	80	75	77
Sweden	13.7	12.6	12.0	*11.6	*11.2	100	92	87	85	82
United Kingdom:	16.3	12.5	12.1	*11.8	*12.3 f/	100	77	74	72	75
England and Wales	(16.1)	(12.3)	(11.9)	(*11.6)	(*12.1)	100	76	74	72	75
Scotland	(16.7)	(13.0)	(12.5)	(12.0)	(*12.4)	100	78	75	72	74
Southern Europe										
Albania	32.5	...	...	...	...	100	...	...	...	...
Greece	16.5	15.7	16.0	*15.4	*15.9	100	95	97	94	97
Italy	16.8	14.8	13.9	*13.2	*12.5	100	88	83	78	74
Malta	16.3	18.3	18.0	17.9	*17.4	100	112	110	110	107
Portugal	19.4	19.0	19.3	*18.4	*16.8	100	97	99	95	87
Spain g/	19.6	19.1	18.2	*18.0	*17.2	100	97	93	92	88
Yugoslavia	17.8	18.2	18.1	*17.7	*17.4	100	102	102	99	97
Western Europe										
Austria	15.1	12.5	11.6	*11.3	*11.3	100	83	77	75	75
Belgium	14.8	12.2	12.3	*12.4	*12.4	100	83	84	84	84
France	16.8	14.1	13.6	*14.0	*13.8	100	84	81	84	82
German Federal Rep. d/	13.4	9.7	9.8	9.5	* 9.4	100	73	73	71	70
Luxembourg	13.0	11.2	11.0	*11.4	*11.4	100	86	84	88	88
Netherlands	18.3	13.0	12.9	12.5	*12.6	100	71	70	68	69
Switzerland	15.8	12.2	11.7	11.5	11.3	100	77	74	73	72

Table 2.2 (cont'd)

Region and country	Crude birth rate (per 1000 population)					Index (1970=100)				
	1970	1975	1976	1977	1978	1970	1975	1976	1977	1978
Oceania										
Australia - New Zealand										
Australia	20.6	16.9	16.4	16.1	*15.7	100	82	80	78	76
New Zealand	22.1	18.4	17.6	17.3	16.3	100	83	79	76	74
Micronesia - Polynesia										
Fiji	29.9	29.0	28.6	27.0	...	100	97	96	90	...
USSR	17.4	18.1	18.4	18.1	...	100	104	106	104	...

... Data not available

* Provisional

Unless otherwise indicated, rates have been calculated on the basis of total live births and of estimated mid-year total population obtained from the United Nations Statistical Office.

a/ Excluding dependencies.

b/ Data cover only Peninsular Malaysia, formerly referred to as West Malaysia.

c/ Including data for East Jerusalem and Israelis in certain territories under occupation by Israeli military forces since June 1967.

d/ The data which relate to the Federal Republic of Germany and the German Democratic Republic include the relevant data relating to Berlin for which separate data have not been supplied. This is without prejudice to any question of status which may be involved.

Table 2.2 (continued)

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e/ Excluding Faeroe - Islands and Greenland

f/ Excluding Northern Ireland

g/ Excluding Centa y Melilla

Table 2.3. Total fertility rates and index numbers for more developed countries and selected less developed countries with relatively good statistics 1970-1977

Region and Country	Rates (per woman) 1970	1975	1976	1977	Index (1970 = 100) 1970	1975	1976	1977
Africa								
Eastern Africa								
Mauritius[a]	3.8	3.3	3.1	3.0	100	87	82	79
Reunion[b]	4.6	...	3.2	...	100	...	70	...
Northern Africa								
Algeria	7.0[c]	...	...	...	100	...	...	...
Tunisia[d]	6.4	5.8	5.6	...	100	91	87	...
Latin America								
Caribbean								
Cuba	4.0[e]	...	...	...	100	...	...	...
Guadaloupe	5.3[f]	...	...	...	100	...	...	...
Jamaica[g]	5.3	4.5	4.3	...	100	85	81	...
Martinique[h]	4.6	...	...	...	100	...	...	...
Puerto Rico	3.2	...	...	...	100	...	...	...
Trinidad and Tobago	3.4	3.1	3.1	...	100	91	91	...
Middle America								
Costa Rica	4.9[i]	3.9[j]	...	...	100	80	...	...
El Salvador[k]	6.0	6.0[l]	...	...	100	100	...	...
Guatemala[m]	6.0	5.7[n]	...	...	100	95	...	...
Mexico	6.5[o]	...	...	...	100	...	...	...
Panama	5.3[o]	4.4[p]	4.4[p]	...	100	83	83	...

Table 2.3 (continued)

Region and Country	Rates (per woman) 1970	1975	1976	1977	Index (1970 = 100) 1970	1975	1976	1977
Latin America cont'd								
Temperate South America								
Argentina	3.0	...	...	...	100	...	...	...
Chile[q]	3.5	3.0	...	...	100	86	...	...
Uruguay	3.0[r]	...	...	...	100	...	...	...
Tropical South America								
Surinam[s]	5.3	...	...	...	100	...	...	...
Venezuela[t]	5.3[u]	4.9[n]	...	...	100	92	...	...
Northern America								
Canada[v][w]	2.3	1.9	1.8	...	100	83	76	...
United States[x]	2.5	1.8	1.8	1.8	100	72	72	74
East Asia								
Japan	2.1	2.0	1.9	1.8	100	95	90	86
Other East Asia								
Hong Kong	3.4	2.8	2.6	2.4	100	82	76	71
Korea								
Korea, Republic of[y]	4.5	3.6	...	...	100	80	...	...
South Asia								
Eastern South Asia								
Malaysia[z]	5.1	4.3	4.3	...	100	84	84	...
Singapore[aa]	3.1	2.1	2.1	1.9	100	68	68	61

Table 2.3 (continued)

Region and Country	Rates (per woman) 1970	1975	1976	1977	Index (1970 = 100) 1970	1975	1976	1977
South Asia cont'd								
Middle South Asia								
Sri Lanka	4.2[bb]	3.4[cc]	...	...				
Western South Asia								
Non-Arab Countries								
Cyprus	2.4[n]	2.1	2.4	2.2	100	88	100	92
Israel[dd]	4.0	3.7	3.7	3.5	100	93	93	87
Europe								
Eastern Europe								
Bulgaria	2.2	2.2	2.3	...	100	100	105	...
Czechoslovakia	2.1	2.5	...	...	100	119	...	...
German Democratic Republic[ee]	2.2	1.5	1.6	1.8	100	68	73	82
Hungary	2.0[ff]	2.4	2.3	2.5	100	120	115	125
Poland	2.2	2.3	2.3	2.2	100	105	105	100
Romania	2.9	2.6	2.6	2.6	100	90	90	90
Northern Europe								
Denmark[gg]	2.0	1.9	1.7	1.7	100	95	85	85
Finland	1.8	1.7	1.7	1.7	100	94	94	94
Ireland	3.8	3.5	...	...	100	92	...	...
Norway	2.5	2.0	1.9	1.8	100	80	76	72
Sweden	1.9	1.8	1.7	1.6	100	95	89	84
United Kingdom[hh]	2.4	1.8	1.7	1.7	100	75	71	71
England and Wales	2.4[ii]	1.8	1.7	1.7	100	75	71	71
Scotland	2.5	1.9	1.8	1.7	100	76	72	68

Table 2.3 (continued)

Region and Country	Rates (per woman) 1970	1975	1976	1977	Index (1970 = 100) 1970	1975	1976	1977
Europe cont'd								
Southern Europe								
Albania	4.8	...	...	...	100	...	...	...
Greece	2.4	2.3	2.4	2.3	100	96	100	96
Italy	2.3	2.3[cc]	2.0	...	100	100	87	...
Malta	2.0	2.1	...	2.2	100	105	...	110
Portugal	2.8	2.6	...	...	100	93	...	...
Spain[jj]	2.9	2.9[cc]	...	...	100	100	...	...
Yugoslavia	2.3	2.3	2.3	...	100	100	100	...
Western Europe								
Austria	2.3	1.8	1.7	1.6	100	78	74	70
Belgium	2.2	1.7	1.7	...	100	77	77	...
France	2.5	1.9	1.9	...	100	78	74	...
Germany, Federal Republic of[ee]	2.0	1.5	1.5	1.4	100	75	75	70
Luxembourg	2.0	1.6[cc]	...	1.5	100	80	...	75
Netherlands	2.6	1.7	1.6	1.6	100	65	62	62
Switzerland	2.1	1.6	1.5	1.5	100	76	71	71
Oceania								
Australia-New Zealand								
Australia	2.9	2.2[kk]	...	2.0	100	76	...	69
New Zealand	3.2	2.4	2.3	2.2	100	75	71	70
Micronesia-Polynesia								
Fiji	3.8	3.5	3.5	...	100	92	92	...
USSR[ll]	2.4	2.4	2.4	...	100	100	100	...

Table 2.3 (continued)

Footnotes and Sources

... **Data not available**

* Provisional

Unless otherwise indicated, rates have been calculated on the basis of data on live births by age of mother and of estimated mid-year female population aged 15-49 years from the United Nations Statistical Office.

a/ Excluding dependencies

b/ Rates have been taken from Republique Francais, Institut National de la Statistique et des Études Économique, Annuaire Statistique de la Reunion 1967-1972 (Paris, 1973), Table 3, p. 36.

c/ For 1969. See: Gourari Négadi, "La fécondité en Algéria, Niveaus-tendances-facteurs", doctoral dissertation, Ecole pratique des hautes études, VI éme section: Sciences économiques et sociales, (Paris, 1975), Table II-4, p. 64.

d/ Rates obtained from Institut National de la Statistique, Projections de la Population de la Tunisie, 1976-2001, (Mars, 1977), p. 4.

e/ For 1970-1975. See: Centro Latinoamericano de Demografía, Latin America: Evaluation of the Demografic Situation in the period 1970-1975, Series A, No. 158, (Santiago de Chile, July 1977), p. 25.

f/ For 1967.

g/ United States, Department of Commerce, Bureau of Census, Country Demographic Profiles: Jamaica, ISP-DP-9, (November 1977), Table A-2, p. 18.

h/ Republique Francaise, Institut National de la Statistique et des études économiques, Annuaire Statistique de la Martinique 1969-1972, (1973), Table 3, p. 30.

i/ Rates have been calculated on the basis of births obtained from Anuario Estadistico 1970, (San José, Costa Rica, Abril du 1972), Table 11, p. 25, and of female population aged 15-49 years. taken from CELADE, Boletin Demográfico Año VII No. 13 (Enero de 1974), Table 2, p. 21, with adjustment to agree with more up-to-date official estimates of total mid-year population.

Table 2.3 (continued)

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j/ United States Department of Commerce, Bureau of Census, Country Demographic Profiles: Costa Rica. ISP-DP-4, (August 1977), Table 7, p. 8.

k/ Rates have been calculated on the basis of female population aged 15-49 years given in CELADE, Boletín Demográfico, Año VII, No. 13, (Enero de 1974), Table 2, p. 22, with adjustment to agree with more up-to-date official estimates of total mid-year population.

l/ For 1971.

m/ Rates have been calculated on the basis of female population aged 15-49 years taken from CELADE, Guatemala: Evaluación del Censo de 1973 y projeción de la población por sexo y edad 1950-2000, Series A, No. 1021, (San Jose, Costa Rica, 1976), Table 26, p. 43, and prorated to mid-year total population given in U.S. Department of Commerce, Bureau of the Census, Country Demographic Profiles: Guatemala, ISP-DP-6 (October 1977), Table 7, p. 9.

n/ For 1973.

o/ Rates have been calculated on the basis of female population aged 15-49 years taken from CELADE, Boletín Demográfico, Año VII, No. 13 (Enero de 1974), Table 2, pp. 26 and 27, with adjustment to agree with more up-to-date official estimates of total mid-year population.

p United States Department of Commerce, Bureau of Census, Country Demographic Profiles: Panama, ISP-DP-7 (November 1977), Table A-2, p. 19.

q/ United States Department of Commerce, Bureau of Census, Country Demographic Profiles: Chile, ISP-DP-13 (February 1978), Table 7, p. 8.

r/ For 1970-1975. See: CELADE, Latin America Evaluation of the demographic situation in the period 1970-1975. Comparison of previous estimates with those derived from recent data, Series A, No. 158 (Santiago de Chile, July 1977), p. 22.

s/ H. E. Lamur, The Demographic Evolution of Surinam, translated by Dirk H. van der Elst (The Hague: Martinus Nijhoff, 1973), p. 56. Rates based on births to mothers 15-44.

t/ Excluding indian jungle population.

u/ For 1971. Rate taken from CICRED, La Población de Venezuela, 1974 World Population Year, (Paris, 1975), Table 4, p. 17.

Table 2.3 (continued)

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v/ Births of Newfoundland prorated to the distribution by age for Canada excluding Newfoundland.

w/ Births including Canadian residents temporarily in the United States but including United States residents temporarily in Canada.

x/ United States Department of Commerce, Bureau of Census, Statistical Abstract of the United States, 1978 (Washington DC, September 1978), Table No. 81, p. 60.

y/ For 1970, See: Lee-Jay Cho, "The own children approach to fertility estimation: An elaboration", in International Union for the Scientific Study of Population, International Population Conference, Liege, 1973 (Liege, 1974), vol. 2, p. 275. For 1975, see: United States Department of Commerce, Bureau of the Census, Country Demographic Profiles: Republic of Korea, ISP-DP-17 (June 1978), Table 7, p. 9.

z/ Data cover only Peninsular Malaysia, formerly referred to as West M alaysia.

aa/ Excluding transient afloat and non-locally domiciled military and civilian services personnel and their dependents.

bb/ For 1971. United States Department of Commerce, Bureau of the Census, Country Demographic Profiles: Sri Lanka, ISP-DP-8 (November 1977), Table 7, p. 8.

cc/ For 1974.

dd/ Including data for East Jerusalem and Israeli residents in certain other territories under occupation by Israeli military forces since June of 1967.

ee/ The data which relate to the Federal Republic of Germany and the German Democratic Republic include the relevant data relating to Berlin for which separate data have not been supplied. This is without prejudice to any question of status which may be involved.

ff 1970 rate has been calculated on the basis of female population aged 15-49 years obtained from Statisztikai Hivatal, Demografiai Evkonyv, 1971. Kozponti (Budapest, 1973), p. 15.

gg/ Excluding Faeroe Islands and Greenland.

hh/ Excluding data for Northern Ireland.

Table 2.3 (continued)

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ii/ 1970 rate has been calculated on the basis of the 1970 female population aged 15-49 years given in Table 6 of the United Nations Demographic Yearbook 1970, with adjustment to agree with the revised official population estimates given in United Kingdom, General Statistical Office, Monthly Digest of Statistics, No. 350 (February, 1975), Table 10, p. 14.

jj/ Excluding Centa y Melilla.

kk/ 1975 rate has been calculated on the basis of female population aged 15-49 years obtained from Australian Bureau of Statistics, Official Yearbook of Australia, 1975 and 1976, No. 61, (Canberra, Australia, 1977), p. 149.

ll/ 1970-1971, 1975-1976, 1976-1977 total fertility rates have been calculated on the basis of age-specific fertility rates published in Roland Pressat, "Situation démographique de l'U.R.S.S. a la veille de son cinquieme recensiment", Population (Paris), 34e année, número 4-5, (Juillet-Octobre 1979), Tableau 5, p. 849.

with 13 countries estimated as having birth rates below 40 per 1000 population. Among the 20 countries having the data to calculate it, the total fertility rates range from 7.7 in Afghanistan and Jordan to 3.4 in Sri Lanka.

Estimates of average fertility levels in Asia depend crucially on the situation in China where roughly 38 per cent of the Asian population resides. As will be noted, the estimate of the crude birth rate for China, shown in table 2.1, is 18.3 per 1000 population (1978), whereas the estimate published in the previous monitoring report was 26 per 1000 population for 1970-75. The basis of these estimates is not known, but it is clear that China is now engaged in an all out effort to bring its rate of growth down precipitously to a natural rate of increase of 5 per 1000 by 1985. This will be achieved with a new policy encouraging the one-child family with financial incentives and at the same time discouraging families from having more than two with financial penalties. 6/ Although there remains some uncertainty about exact levels and trends, there is no doubt that China is undergoing rapid demographic change.

In general, fertility levels in East Asia are significantly lower than levels in South Asia. The developing countries of China, Hong Kong, the Republic of Korea and Singapore are notable in having crude birth rates well below 30 per 1000 population. On the other hand, the Arab countries of Western South Asia, excepting Lebanon, have the highest fertility levels on average in this region.

Information of fertility trends is available for only a few relatively small and non-typical Asian countries. Hong Kong, the Republic of Korea, Malaysia, Singapore and Sri Lanka have all shown substantial declines in total fertility rates since 1970 with Hong Kong and Singapore showing particularly rapid declines. Israel also experienced a notable decline in its total fertility rate since 1970.

Europe, Japan, North America, Oceania and USSR

From a demographic perspective, a distinction of these countries from the rest of the world is no longer systematically applicable. Although the average levels of fertility continue to be notably higher in the continents of Africa, Asia and Latin America than elsewhere, there is an increasing amount of overlap between these regions and the countries of Europe, North America, Oceania and the USSR.

6/ Chen Muhua, "Birth planning in China", International Family Planning Perspectives, vol. 5(3), September 1979, pp. 92-101.

Not only is this a group of countries that is more homogeneous with respect to fertility levels, but it is a group that has attained extraordinarily low levels of fertility. Using the most recent estimates available for each country and excluding 2 countries (Albania, and Ireland) with atypically high fertility, we find crude birth rates ranging from a high of 19.6 per 1000 population in Romania to a low of 9.4 per 1000 population in the Federal Republic of Germany. Likewise, total fertility rates range from 2.9 in Spain to 1.4 in the Federal Republic of Germany with 14 out of 22 countries in this group for which measures were available in 1977 having a total fertility level below the replacement level of 2.1.

Overall, fertility levels in Northern and Western Europe are notably lower than in the rest of the group. In Northern Europe, only Ireland has a total fertility rate above the replacement level of 2.1 and in Western Europe, France has the highest level of fertility with a total fertility rate of 1.9. Fertility rates in Canada, Japan and the United States are now also well below replacement, although rates of population growth are higher in North America because of higher crude birth rates, attributable to the age distribution of the population.

The fertility trend in Northern Europe has been consistently down for all countries in the group, with rates converging within a range of 1.6-1.8, with the exception of Ireland which is clearly a case apart. All the countries of Western Europe have also experienced steady declines, their fertility rates currently range from 1.4 to 1.9. Less information is available on recent trends in Southern Europe but, with the exception of Italy which shows a sharp decline in 1976, the other countries in this group show fairly stable fertility levels.

In Northern America, as well as Japan, Australia and New Zealand, fertility trends have continued downward. In the United States, however, both the crude birth rate and the total fertility rate moved upward during years after 1970. During the same period in the USSR both the crude birth rate and the total fertility rate has been remarkably stable.

Eastern Europe is a particularly interesting region because, although on average these countries had the lowest fertility levels in Europe in 1970, the levels currently recorded generally exceed levels now prevailing in Western and Northern Europe. With the exception of Italy, all the countries of Southern Europe have fertility rates above replacement.

In all of these countries, fertility measures are based on complete birth registration which permits an analysis of trends for most or at least part of the decade of the 70's. In the Eastern European countries with the exception of Poland and Romania, the most striking trend is one of increases in fertility from levels recorded in 1970 or 1975. During the last 10 to 15 years, all of the Eastern European countries except Poland have had aggressive population policies to increase population growth. The package of policies has been different in each country, and the policies have evolved in unique ways, but the net result appears to be some definite impact on fertility levels at least in the short run. 7/ In the case of Hungary, the total fertility rate has shown a steady rise since 1974 despite continuing declines in the crude birth rate. The increased fertility can be explained at least in part by severe restrictions on abortion introduced in Hungary for the first time in 1974 as well as an expansion of various family benefits. The total fertility rate in the Democratic Republic of Germany fell to the record low level of 1.5 after the institution of abortion on demand in 1972 and has since rebounded steadily in response to enormously expanded family benefits, in particular the extremely generous maternity leave and education leave benefits now granted to women after the birth of their second child.

The figures for Bulgaria and Czechoslovakia are for year less recent, but they also show increases since 1970. In Czechoslovakia, the early 70's were a period of rapidly expanding benefits for second and third children. 8/ In Bulgaria, laws calling for further restrictions on abortion and expanded benefits for the second and third child were passed in 1973. In Romania, the fertility levels continue to decline from the height achieved after extreme abortion restrictions were imposed at the end of 1966. But despite the fairly steady declines, the fertility rate in Romania remains the highest in Eastern Europe.

Socio-economic factors affecting fertility in developing countries

In addition to information on levels of fertility, the World Fertility Survey has provided data about factors that influence fertility

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7/ Roland Pressat, "Measures natalistes et relevement de la fécondité en Europe de l'Est" Population, 34(3) May-June 1979, pp. 533-547.

8/ Tomas Frejka, "Fertility trends and policies: Czechoslovakia in the 1970's", Population and Development Review, vol. 61, No. 1 (March 1980), pp. 65-94.

levels and change. Reports on surveys conducted in fifteen developing countries 9/ generally confirm previous knowledge of these factors.

9/ The fifteen countries are Bangladesh, Colombia, Costa Rica, Dominican Republic, Fiji, Indonesia, Malaysia, Mexico, Nepal, Pakistan, Panama, Peru, Republic of Korea, Sri Lanka and Thailand. Data for them referred to in this section are from the following sources:

World Fertility Survey, *Bangladesh Fertility Survey 1975, First Report* (Dacca, Government of the Peoples Republic of Bangladesh, Ministry of Health and Population Control, 1978).

Instituto Internacional de Estadistica, *Encuesta Nacional de Fecundidad Colombia 1976, Resultatos Generales* (Bogotá, 1977).

Dirección General de Estadistica y Censos, *Encuesta National de Fecundidad 1976 Costa Rica* (San José, 1978).

Consejo Nacional de Poblacion y Familia, *Encuesta Nacional de Fecundidad Informe General* (Santa Domingo, 1976).

World Fertility Survey, *Fiji Fertility Survey 1974, Principal Report* (Suva, Bureau of Statistics, 1976).

Central Bureau of Statistics and World Fertility Survey, *Indonesia Fertility Survey 1976, Principal Report* Volume I and II (Jakarta, 1978).

World Fertility Survey, *The Korean National Fertility Survey 1974, First Country Report* (Seoul, Korean Institute for Family Planning, 1977).

World Fertility Survey, *Malaysian Fertility and Family Survey - 1974 First Country Report* (Kuala Lumpur, National Family Planning Board, 1977).

Secretaria de Programacion y Presupuesto, *Encuesta Mexicana de Fecundidad Primer Informe Nacional* Volume I and II (Mexico, 1979).

World Fertility Survey, *Nepal Fertility Survey, 1976, First Report* (Kathmandu, His Majesty's Government, Ministry of Health, 1977).

World Fertility Survey, *Pakistan Fertility Survey, First Report*, (Lahore, Population Planning Council of Pakistan, 1976).

Oficiana de Estudios de Pablacion, *Encuesta de Fecundidad, Informe General Panama 1977* (1977).

Instituto Nacional de Planification, *Encuesta Nacional de Fecundidad de Peru 1977-1978, Informe General* (Lima, Direccion General de Censos, Encuesta y Demografia, 1979).

Department of Census and Statistics, Ministry of Plan Implementation, *World Fertility Survey Sri Lanka 1975, First Report* (Colombo, 1978).

World Fertility Survey, *The Survey of Fertility in Thailand: Country Report* Volume I and II (Bangkok, Institute of Population Studies, Chulalongkorn University and Population Survey Division, National Statistical Office, 1977).

B. Fertility Differentials and Factors Influencing Them

Differences among countries in cumulative fertility

As measured by the number of children ever born alive, the range in cumulative fertility among women in these samples is comparatively wide, from a mean of 3.3 children per woman in Nepal to 4.5 in Peru and Mexico. A standard deviation of 2.3 births per woman indicates least dispersion in Korea, where very large families are no longer common place, and a corresponding value of 3.3 for Pakistan, Dominican Republic and Colombia, evidence of greater dispersion in those countries. There also are differences among them with respect to the proportions childless and with large families. Childlessness ranges from 4.8 per cent in Peru to 17.8 in Nepal, a country in which marriage frequently occurs at a very early age and adolescent sterility appears to be very high. On the other hand, those with nine or more live births comprise 2.3 per cent of the total in Korea and 13.8 per cent in Mexico (table 2.4).

One of the convenient measures that can be derived from the WFS data is the average number of children that had been born alive to a cohort of ever-married women up to the time of the survey. The ranges in distributions of women by numbers of children ever born shown in table 2.4 are attributable, inter alia, to the heterogeneity of the samples in respect to distributions by current age, marital duration and current marital status. What follows is a discussion of the cumulative fertility of birth and marriage cohorts.

Age specific cumulative fertility

There is a gain in homogenity when the women are grouped roughly according to their time of birth, the advantage being that each group of women will have experienced similar cultural and related conditioning and will have been exposed to similar changes in national tastes, values and economic and social conditions.

Table 2.5 gives the mean parity of successive five year age groups of all ever-married women, the mean for the sample and a standardized total. It is at once clear that the sample means do not give a full picture of the cross-national variations in cumulative fertility. The highest sample means are found for Mexico, Peru, Colombia and Pakistan but, at ages 25-29 for example, the highest values are found for Bangladesh (4.2) and for Mexico, Dominican Republic and Pakistan (3.4). In some countries such as Bangladesh, Dominican Republic, Nepal and Indonesia there is comparatively little difference between cumulative fertility at ages 35-39 and at ages 45-49, suggesting that childbearing is virtually completed by the age of 40. But in others, such as Peru, Colombia and Costa Rica, completed fertility is nearly one-third higher than the level attained at ages 35-39.

Table 2.4 The per cent distribution of all ever-married women according to total number of children ever born a/

Total Births	Bangladesh	Pakistan	Mexico	Dominican Rep.	Peru	Colombia	Costa Rica	Panama	Malaysia	Fiji	Thailand	Sri Lanka	Nepal	Indonesia	Korea Rep.
0	14.3	14.1	7.7	11.2	4.8	7.8	6.1	5.9	7.5	11.4	8.0	8.4	17.8	13.4	6.5
1	13.0	11.5	12.0	15.1	12.7	13.4	14.7	13.0	12.3	13.6	15.2	14.6	13.9	17.1	13.2
2	11.8	11.2	13.7	13.5	14.3	15.7	18.1	16.8	14.0	14.3	15.6	14.0	13.7	14.9	15.3
3	10.5	10.4	12.6	11.7	13.8	14.1	14.6	16.0	13.9	13.5	12.9	13.5	12.9	12.2	17.4
4	10.1	99.7	10.5	10.5	11.4	10.2	10.1	12.2	11.4	11.0	11.9	11.8	11.3	10.1	15.9
5	9.5	9.2	9.1	9.0	9.7	9.0	7.8	10.1	10.2	10.1	9.6	9.9	9.0	8.8	12.1
6	8.6	8.7	8.0	7.1	7.9	6.4	6.9	7.7	8.3	7.6	7.8	8.4	7.5	8.0	8.4
7	7.4	8.5	7.0	5.0	7.0	6.0	5.0	6.1	7.1	6.5	5.5	6.5	5.5	5.6	5.8
8	5.6	6.1	5.5	4.6	5.6	4.9	3.8	4.1	5.4	4.5	4.9	5.2	3.6	4.3	3.2
9 or more	9.2	10.5	13.8	12.5	12.9	12.5	13.0	8.1	9.8	7.5	8.6	7.7	4.7	5.6	2.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean parity	4.0	4.3	4.5	4.1	4.5	4.3	4.2	4.0	4.2	3.8	3.9	3.9	3.3	3.5	3.6
Standard deviation b/	3.1	3.3	3.2	3.3	3.2	3.3	3.2	2.7	3.0	2.9	2.9	2.8	2.7	2.8	2.3
Q 25c/	0.8	0.9	1.4	1.1	1.5	1.2	1.2	1.4	1.4	1.0	1.1	1.1	0.5	0.7	1.3
Q 50c/	3.0	3.3	3.4	2.9	3.4	2.9	2.8	2.9	3.2	2.8	2.9	3.0	2.4	2.4	2.9
Q 75c/	5.7	6.0	6.2	5.5	6.1	5.7	5.5	5.1	5.7	5.2	5.2	5.3	4.6	4.8	4.6

Notes:

a/ **On this and most of the following tables** number of cases are not shown in the interest of brevity.

b/ **Partly estimated.**
c/ **Calculated**

Sources:

See footnote 9 to this chapter.

Table 2.5 Mean number of children ever born to all ever-married women by current age (at the time of the survey)

Age	Bang-ladesh	Pak-istan	Mexico	Domin-ican Rep.	Peru	Col-ombia	Costa Rica	Pan-ama	Mal-aysia	Fiji	Thai-land	Sri Lanka	Nepal	Indo-nesia	Korea Rep.
Under 20	0.7	0.6	1.0	0.8	1.0	1.0	...	...	0.8	0.5	0.7	0.7	0.3	0.6	0.5
20-24	2.4	1.9	2.0	1.8	2.0	1.8	1.6	1.7	1.7	1.5	1.5	1.6	1.4	1.7	1.0
25-29	4.2	3.4	3.4	3.4	3.2	3.1	2.5	2.9	2.8	2.7	2.6	2.6	2.9	2.8	2.0
30-34	5.7	5.1	5.0	4.8	4.5	4.5	3.9	4.1	4.2	4.2	3.9	3.9	4.1	4.1	3.4
35-39	6.7	6.2	6.3	6.5	5.9	5.6	5.4	5.2	5.5	5.2	5.0	4.9	5.1	4.8	4.4
40-44	7.1	7.2	7.0	6.5	6.6	6.6	6.7	5.8	6.1	6.2	6.1	5.5	5.5	5.3	5.1
45-49	6.7	7.1	7.1	6.8	7.0	7.3	7.2	5.9	6.2	6.6	6.8	6.0	5.7	5.2	5.8
Total	4.0	4.3	4.5	4.1	4.5	4.3	4.2	4.0	4.2 a/	3.8	3.9	3.9	3.3	3.5	3.6
Standardized Total b/	4.8	4.5	4.5	4.4	4.3	4.2	4.2	4.0	3.9	3.8	3.6	3.6	3.6	3.5	3.1

Notes:

... Data not available in the published report.

a/ Total includes 193 women of age 50.

b/ Standardized on the "overall" distribution of 13 countries (without Costa Rica and Panama). While this standard is an arbitrary one it has the advantage of a considerable history of use in demographic research.

Sources:

See footnote 9 to this chapter.

Because we are dealing here with ever-married women, existing differences among the countries in levels of adult male mortality and the incidence of divorce surely represent a determinant of variations in cumulative fertility at the older ages.

These data do not represent the fertility of a single group of women as they pass through the reproductive ages, because of possible changes in fertility patterns over time. These data reflect behaviour that, in some cases took place several decades prior to the survey. Nonetheless, certain differences among the countries in patterns of family building can be observed. The values in table 2.5 for women under age 20 are very low in Korea and Nepal, but for different reasons. There appears to be some sub-fecundity in Nepal that is attributable to marriage at too early an age, while Korean women have begun to advance the age at which they bear their first child.

Cumulative fertility taken as the mean number of children born to women aged 40-44 years 10/ varies relatively widely, from more than seven children in Bangladesh and Pakistan to about five children in Korea. It is also of interest that the prevalence of primary sterility, measured by the proportion reported childless for this age group, is quite low in all countries, from 6.0 per cent in the Dominican Republic to 1.5 per cent in Korea.

Duration of marriage and age at marriage

The use of marriage duration as a control in the analysis has the advantage that it is very closely linked to the stages of reproduction; the period of reproductive risk normally is specified better by marriage duration than by age, except where first marriage commonly occurs very early, as in Nepal, or after the peak reproductive years. In a comparative analysis such as this, however, it is important to bear in mind some problems of inter-country comparability regarding duration of marriage.

Among the problems are that, in some cultures, the date of first marriage may not coincide with the beginning of cohabitation, and marital stability varies significantly cross-nationally. (At the time of the survey more than four times as many of first marriages had been dissolved in the Dominican Republic (44 per cent) as in Pakistan (10 per cent)). Moreover, the causes of marital dissolution vary, as do the customs regarding remarriage. In some countries, marriages are dissolved more frequently by separation or divorce, and remarriage is fairly common. In others, the majority of marital disruptions are due to widowhood, and presumably occur later in the life cycle; and in some cultures, remarriage of women is not common. Thus, although duration of marriage has been defined in each survey as "years since first marriage" the proportions of ever-

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10/ This avoids the particular problem of under-reporting of children ever born to women aged 45-49.

married women that have been in continual exposure to childbearing, i.e., in unbroken marriages, will differ cross-nationally. "Duration specific" fertility will also be influenced by age at first marriage, the median of which also varies among countries. From the data in table 2.6, it is seen that, in the youngest marriage duration group, the mean number of children ever born varies substantially among the countries with a range that is at first glance somewhat surprising, from 0.5 children in Nepal and 0.6 in Bangladesh and Pakistan to 1.3 children in Costa Rica and Peru. The prevalence of adolescent sterility has been proposed as a reason for low marital fertility rates at early ages and at short durations of marriage. For example, in Bangladesh and Nepal, early adolescent marriage and the consummation of these marriages is not uncommon.

Completed family size, i.e., cumulative fertility after 30 or more years, is generally highest in the countries of South and Central America. Indeed, among the fifteen countries, the range while less broad than at the early durations is still considerable, from 5.3 children per woman in Indonesia to 9.1 in Colombia.

Data in table 2.6 also suggest that, in Nepal, Indonesia, Malaysia, Bangladesh and Pakistan, there is very little childbearing during the latter part of the reproductive cycle. In these countries, the cumulated fertility of women married for 20-24 years is from 87 to 100 per cent as high as that of women who had been married for 30 years or longer. The significance of this is suggested by the finding for the remaining ten countries, in which the differences in cumulated fertility between these two duration groups range from 75 per cent in Colombia, where completed family size is largest, to 85 per cent in Mexico and the Dominican Republic. As these figures relate to behaviour that took place 20 and more years prior to the survey, a fertility decline would probably not explain these differences, although differential incidence of widowhood and of recall lapse among women at higher durations cannot be discounted as possible factors. On the other hand, varying practices in respect to remarriage and the continuation of childbearing after a daughter bears a child could also have a bearing on these data.

A further analysis of the first country reports also revealed that the distributions by age at first marriage of ever-married women whose first marriage had been 10 to 19 years ago vary substantially from country to country. The percentage of women already married at age 20 ranges from 88.4 in Nepal to 39.0 in Korea. Accordingly, there are large differences among these countries in mean age at first marriage of women aged 25 to 29 at the time of the surveys; a range of from 12.8 years in Bangladesh to 21.6 years in Korea can be observed.

Generally speaking, in these countries age at first marriage is inversely related to fertility cumulated within a given time span. However, when broad groups of age at first marriage are used, the groupings camouflage the fact, as noted above, that this relationship frequently does not hold at the shortest durations of marriage. In addition to adolescent sub-fecundity, already mentioned, in some countries early marriage often results in separations, reducing the total exposure time for women currently in a second or later marriage.

Table 2.6 **Mean number of children ever born to all ever-married women by number of years since first marriage**

Duration	Bangladesh	Pakistan	Mexico	Dominican Rep.	Peru	Colombia	Costa Rica	Panama	Malaysia	Fiji	Thailand	Sri Lanka	Nepal	Indonesia	Korea Rep.
0-4	0.6	0.6	1.2	0.9	1.3	1.2	1.3	1.2	1.1	1.0	1.0	0.9	0.5	0.7	1.1
5-9	2.1	2.5	3.0	2.6	3.0	2.8	2.5	2.7	2.8	2.6	2.5	2.5	1.7	2.0	2.7
10-14	3.5	4.1	4.7	4.2	4.4	4.3	4.0	3.8	4.1	3.9	3.8	3.7	3.1	3.2	3.7
15-19	5.0	5.6	6.1	5.8	5.8	5.7	5.5	5.1	5.3	5.0	5.0	4.8	4.4	4.2	4.4
20-24	6.1	6.8	7.3	6.8	6.7	6.8	7.0	5.9	6.2	5.7	6.1	5.7	5.2	5.0	5.1
25-29	6.9	7.1	7.7	7.1	7.8	8.1	8.7	6.6	6.8	6.7	7.2	6.5	5.8	5.3	5.5
30 or more	6.8	7.4	8.6	8.0	8.4	9.1	8.4	7.3	6.2	7.5	7.5	6.9	6.0	5.3	6.3
Total	4.0	4.3	4.5	4.1	4.5	4.3	4.2	4.0	4.2	3.8	3.9	3.9	3.3	3.5	3.6

Sources:

See footnote 9 to this chapter.

Socio-economic differentials in cumulative fertility

The comparative analysis of variations in fertility among population subgroups of different countries is an aid in identifying important influences upon fertility behaviour and in explaining, at least in part, the variations among these countries in fertility levels and trends. For many purposes, it may be sufficient to establish the existence of certain patterns, either globally or in groups of countries with common characteristics, rather than to measure differences among countries in the strength of a relationship. In this case, cumulative fertility differentials between education and occupation groups as well as urban/rural residence will be examined briefly. These differentials were chosen for illustrative purposes because of their coverage in the first country reports.

In table 2.7, the mean number of children ever born to ever-married women by women's level of education is given for three broad marital duration groups, namely, for women, whose first marriage had been less than 10 years ago, 10 to 19 years, and 20 years or more. Use of marriage cohorts controls somewhat for marital exposure, but the most educated women, for example, will tend to be the younger ones who also will have married later and, for both these reasons, there will be some small confounding effect of age at marriage and current age.

Although some studies have revealed a curvilinear relationship between levels of fertility and women's educational status in various European countries and in the United States, classically it has been inverse - the higher the education the lower the fertility. The latter holds true for all but one of the fifteen countries, the exception being Indonesia. Marriage dissolution is a common-place in Indonesia, and this exception reflects, inter alia, the greater marriage stability of better educated women, so that they are in a marital union more consistently than women with less education. In all other countries, the average number of births to women married 10 to 19 years decreases from the lowest educational categories to the highest, the difference ranging from 3.2 births in Costa Rica to 0.2 in Nepal.

Generally, the data on educational differentials in fertility for the countries of Latin America show stronger variation than is found for the countries of Asia. In those countries, with the exception of Korea, there are only small or no differences in the fertility of women with "no" and those with "primary" education, and a substantial negative effect is apparently only at the highest educational levels (of course, again with the exception of Indonesia). It should be of interest to determine how and to what extent these individual level relationships were associated with the general level of education in these societies.

Table 2.7 Mean number of children ever born to ever-married women by number of years since first marriage and level of education

Years married; Education	Bangladesh	Pakistan	Mexico	Dominican Rep.	Peru	Colombia	Costa Rica	Panama	Malaysia	Fiji	Thailand	Sri Lanka	Nepal	Indonesia	Korea Rep.
Less than 10 years															
No educ.	...	1.5	2.5	2.2	2.5	2.5	2.9	3.0	2.2	1.9	1.8	1.9	1.1	1.2	2.5
Primary	...	1.4	2.2	1.8	2.3	2.1	2.1	2.4	2.0	2.0	1.8	1.7	1.2	1.4	2.0
More than primary	...	1.6	1.6	1.2	1.8	1.4	1.5	1.7	1.4	1.6	1.3	1.6	(1.1)	1.4	1.7
Total	1.3	1.5	2.1	1.7	2.1	2.0	1.9	2.0	1.9	1.8	1.7	1.7	1.1	1.3	1.8
10-19 years															
No educ.	...	4.8	5.9	5.7	5.8	5.8	6.4	5.4	4.8	4.6	4.6	4.5	3.7	3.6	4.6
Primary	...	4.8	5.5	5.0	5.2	5.0	4.9	4.8	4.8	4.6	4.4	4.4	3.8	3.6	4.2
More than primary	...	4.1	3.8	3.6	3.7	3.8	3.2	3.5	3.4	4.0	3.4	4.0	(3.5)	4.2	3.3
Total	4.1	4.8	5.3	4.9	5.1	5.0	4.6	4.4	4.7	4.4	4.4	4.3	3.7	3.7	4.1
20 years or more															
No educ.	...	7.1	8.0	7.5	8.3	8.0	9.3	7.9	6.4	6.8	6.6	6.6	5.6	5.1	6.0
Primary	...	6.5	7.8	7.2	7.1	7.6	8.0	6.6	6.5	6.3	6.8	6.2	5.2	5.6	5.3
More than primary	...	6.3	5.1	4.0	4.8	5.8	4.8	4.8	4.9	5.5	4.3	5.6	(4.0)	5.9	4.3
Total	6.6	7.1	7.7	7.1	7.4	7.5	7.8	6.4	6.4	6.3	6.7	6.2	5.6	5.2	5.6
All															
No educ.	...	4.4	6.0	5.5	6.2	5.7	7.3	6.1	5.4	5.2	5.1	5.1	3.3	3.9	5.3
Primary	...	3.4	4.5	4.2	4.5	4.3	4.7	4.6	3.9	4.4	3.8	4.2	2.2	3.1	3.6
More than primary	...	2.9	2.6	2.2	2.7	2.7	2.3	2.7	2.1	2.8	2.1	2.9	(1.9)	2.8	2.3
Total	4.0	4.3	4.5	4.1	4.5	4.3	4.2	4.0	4.2	3.8	3.9	3.9	3.3	3.5	3.6

Sources: See footnote 8 to this chapter.

Notes:

... Data not available in the published report.

( ) Twenty or fewer cases.

In the guidelines for the WFS first country reports, 11/ there is no explicit suggestion to relate women's fertility to the educational attainment of their husbands, so that only a few first country reports included tabulations on this topic. Owing to space restrictions it is possible only to relate here such insights as are provided by data in the Thailand first country report, where a cross-tabulation of the mean number of children ever born by the educational levels attained by each spouse is given. The general impression is that the relation between husband's education and fertility is similar in direction and strength to that between wife's education and fertility.

It is generally believed that, in societies undergoing demographic, social and economic changes, characteristics associated with current urban living and life styles initiate and promote the desire for smaller families and a reduction of fertility. However, a current characteristic, in this case rural or urban residence, may mask a different trait whose influence crystallized over many years, and which would affect the validity of the information provided by the characteristic.

With the exception of Pakistan and Indonesia, women residing in urban areas had lower fertility than did those living in rural areas (table 2.8). In Pakistan, urban fertility may be higher than rural fertility, because of better health and nutritional conditions and/or more completed reporting of births among urban women. 12/ In respect to Indonesia, this may reflect not only more complete urban reporting but, possibly, greater stability of marriage in urban areas.

The excess of rural over urban fertility for women married 10 to 19 years ago ranges from 0.3 in Sri Lanka to 1.6 in Costa Rica. The countries that have the highest proportion of respondents residing in urban areas also have the largest urban/rural differential (coefficient of correlation, r = 72 among ten countries considered). One possible explanation of this is that the effect of urban life upon fertility may become more pronounced as urbanization spreads.

11/ World Fertility Survey, Guidelines for Country Report No. 1, Basic Documentation No. 8 (World Fertility Survey, London, 1977).

12/ The Pakistan Fertility Survey 1975: A Summary of Findings, London: World Fertility Survey, No. 3, 1977.

Table 2.8. Mean number of children ever born by number of years since first marriage and type of place of residence

Years married; Residence	Bangladesh	Pakistan	Mexico	Dominican Rep.	Peru	Colombia	Costa Rica	Panama	Malaysia	Fiji	Thailand	Sri-Lanka	Nepal	Indonesia	Korea Rep.
Less than 10 years															
Urban	...	1.6	...	1.6	2.0	1.8	1.7	1.7	1.7	1.8	1.6	1.7	...	1.6	1.8
Rural	...	1.5	...	1.9	2.2	2.3	2.2	2.2	1.9	1.7	1.7	1.7	...	1.3	1.9
Total	1.3	1.5	2.1	1.7	2.1	2.0	1.9	2.0	1.9	1.7	1.7	1.7	1.1	1.3	1.8
10-19 years															
Urban	...	5.1	...	4.4	4.4	4.5	3.9	3.6	3.9	4.0	3.9	4.1	...	4.0	3.6
Rural	...	4.7	...	5.6	5.5	6.0	5.5	4.7	4.8	4.6	4.5	4.4	...	3.7	4.4
Total	4.1	4.8	5.3	4.9	5.1	5.0	4.6	4.4	4.7	4.4	4.4	4.3	3.7	3.7	4.1
20 years or more															
Urban	...	7.1	...	6.0	6.1	7.0	6.2	5.1	6.3	5.7	5.7	5.8	...	5.5	4.8
Rural	...	7.1	...	8.0	8.0	8.4	9.1	6.8	6.5	6.7	6.8	6.4	...	5.2	6.1
Total	6.6	7.1	7.7	7.1	7.4	7.5	7.8	6.4	6.4	6.4	6.7	6.2	5.6	5.2	5.6
All															
Urban	...	4.4	...	3.5	3.7	3.9	3.5	3.0	3.7	3.5	3.3	3.6	...	3.6	3.0
Rural	...	4.2	...	4.8	5.1	5.0	5.1	4.4	4.3	4.0	4.0	4.0	...	3.4	4.2
Total	4.0	4.3	4.5	4.1	4.5	4.3	4.2	4.0	4.2	3.8	3.9	3.9	3.3	3.5	3.6

Sources: See foontnote 9 to this chapter.

Note :

... **Data not available in the published report.**

Data for Korea, which are available in the first country report, support the hypothesis that fertility levels are influenced not only by the current residence of the respondent but are also affected by the place of childhood residence. Thus, fertility is highest among women who grew up in villages and were residing there at the time of the survey, and was lowest among women with place of residence in cities both in childhood and at the time of the survey, the values for women married 10-19 years being, respectively, 4.5 and 3.2 live births. Fertility of "migrants" appears to be between these extremes. Of course, these findings are subject to many qualifications but they appear broadly to confirm the findings of some earlier studies. 13/

Occupation, especially of the husband, has been probably the most widely utilized index of socio-economic status in the study of fertility differentials. Classically, changes in the occupational distribution of the population of industrially advanced countries have accompanied the general declines in fertility. Relatively high fertility has been associated with occupations in the primary industries, particularly agriculture and mining, while lower fertility has been associated with the professional classes, white collar workers, and urban industrial workers.

Not all countries used the WFS recommended classification of occupations in their first country report. Thus, in table 2.9 the data have been collapsed into five categories so as to secure some comparability among the countries. There is also the problem of ambiguity in respect to time reference: husbands of the respondents may have had a different occupation or none at all at important times in the past.

Concentrating on women whose first marriage had been 10 to 19 years earlier, in seven out of ten countries with available data, those whose husbands are engaged in agriculture tend to have the largest number of children. In contrast, wives of professionals, technicians, administrators, and clerks in these seven countries had the lowest fertility, while the fertility of wives of manual workers occupied an intermediary position. A difference of more than one child between the agricultural and the professional, managerial, technical and clerical occupations is reported for Colombia, Panama, Mexico, Thailand and Korea. Within the manual worker category, spouses of men classified as "skilled" in these seven countries had had fewer children than those of "unskilled" workers.

13/ United Nations, Fertility and Family Planning in Europe Around 1970: A Comparative Study of Twelve National Surveys, Population Studies No. 58, New York, 1976.

Table 2.9 Mean number of children ever born to ever-married women by number of years since first marriage and occupational status of husband

Years married; occupation	Bangladesh	Pakistan	Mexico	Dominican Rep.	Peru	Colombia	Costa Rica	Panama	Malaysia	Fiji	Thailand	Sri-Lanka	Nepal	Indonesia	Korea Rep.
Less than 10 years															
1	...	1.5	1.7	...	...	1.5	...	1.7	1.6	1.5	1.2	1.6	...	1.7	1.8
2	...	1.5	2.1	...	...	1.8	...	1.9	2.0	1.6	1.6	1.7	...	1.4	1.8
3	...	1.6	2.2	...	...	2.3	...	2.7	1.9	1.9	1.8	1.7	...	1.2	2.0
4	...	1.5	2.1	...	...	1.9	...	2.0	1.9	1.8	1.7	1.6	...	1.5	1.8
5	...	1.5	2.2	...	...	1.9	...	2.5	2.2	1.8	1.7	1.8	...		2.0
Total	1.3	1.5	2.1	1.7	2.1	2.0	1.9	2.0	1.9	1.7	1.7	1.7	1.1	1.3	1.8
10-19 years															
1	...	4.5	4.3	...	...	3.8	...	3.5	4.0	3.9	3.5	3.6	...	4.1	3.5
2	...	5.0	5.1	...	...	4.2	...	3.9	4.4	4.1	3.8	4.2	...	3.9	3.7
3	...	4.7	5.8	...	...	5.8	...	5.2	4.8	4.7	4.6	4.5	...	3.5	4.6
4	...	4.9	5.5	...	...	4.8	...	4.4	4.8	4.3	4.2	4.2	...	3.8	3.8
5	...	4.8	5.6	...	...	5.7	...	5.1	5.0	4.4	4.3	4.4	...		4.2
Total	4.1	4.8	5.3	4.9	5.1	5.0	4.6	4.4	4.7	4.4	4.4	4.3	3.7	3.7	4.1
20 years or more															
1	...	7.0	6.2	...	...	5.6	...	4.7	5.6	5.8	5.2	5.1	...	5.7	4.7
2	...	7.2	7.1	...	...	6.8	...	6.0	6.5	6.2	6.3	6.0	...	5.4	4.9
3	...	7.1	8.2	...	...	8.4	...	7.4	6.5	6.8	7.1	6.5	...	5.1	6.2
4	...	7.2	7.8	...	...	7.0	...	6.1	6.5	6.2	5.6	6.1	...	5.5	4.9
5	...	6.7	(6.4)	...	...	7.7	...	6.9	6.7	5.9	7.4	6.2	...		5.5
Total	6.6	7.1	7.7	7.1	7.4	7.5	7.8	6.4	6.4	6.4	6.7	6.2	5.6	5.2	5.6
All															
1	...	3.9	3.3	...	...	2.8	...	2.7	3.2	3.2	2.9	3.0	...	3.5	2.9
2	...	4.3	4.3	...	...	3.8	...	3.6	4.5	3.2	3.5	3.7	...	3.6	3.1
3	...	4.4	5.3	...	...	5.1	...	5.3	4.6	4.4	4.3	4.3	...	3.4	4.6
4	...	4.2	4.5	...	...	4.0	...	3.9	4.1	3.7	3.2	3.6	...	3.5	3.0
5	...	4.1	4.5	...	...	4.5	...	4.8	4.4	3.7	4.2	4.1	...		3.8
Total	4.0	4.3	4.5	4.1	4.5	4.3	4.2	4.0	4.2	3.8	3.9	3.9	3.3	3.5	3.6

Notes: ... Data not available in the published reports.
( ) Twenty or fewer cases.

Sources:
See footnote 9 to this chapter.

Occupational status of husband code:
1 - Professional, managerial, technical, clerical.
2 - Sales and service 3 - Agricultural
4 - Skilled manual 5 - Unskilled manual

The difference, however, with the exception of Colombia and Panama, was usually small. In general it has been found that the relationship between fertility and wife's occupation was similar to its relationship with the husband's occupation.

It is not only expected that the type of work (i.e., occupation) will affect fertility but, in the case of women, the degree of participation itself will also be an important determining factor. As this question was not well covered in the first country reports, space prohibits a full discussion of this question. Suffice it to say, that in six out of the seven countries reporting fertility differentials by women's pattern of work, for women whose first marriage was of 10 to 19 years duration, women who had ever worked since marriage had lower fertility than those who had not worked at all. However, the complexity of this relationship and the paucity of data published in the first country reports prohibit any conclusions.

Current fertility

Age patterns

A very useful indicator of current fertility behaviour that is available from the WFS surveys is the mean number of children born during the five years immediately preceding the surveys, to currently married women who have been married for at least five years. These women constitute from 54 per cent of all ever-married women in the Dominican Republic to 74 per cent in Nepal and Pakistan.

Tables 2.10a and 2.10b gives the mean number of births in the past five years to women continuously married in that interval according to the woman's current age. For women currently aged 20-24 years, the mean number of births ranges from 1.1 in Thailand to 2.2 in Peru, corresponding to about 220 to 440 births a year per 1000 married women during the past five years. After the age at which peak fertility is recorded, the mean number of births decreases as age increases in all countries, so that at ages 45-49 current fertility rates are very low, varying from 0.1 in Panama, Korea and Malaysia to 0.3 in four other countries.

As would be expected, inasmuch as the women in these samples differ with respect to average age at first marriage, mean parity and other related factors such as length of breast-feeding, there are considerable variations in age patterns of "current" fertility. Among the 12 countries for which the fertility of all five-year age groups could be examined, there are four patterns, as indicated by the age group in which "current" fertility is highest. Both Mexico and Pakistan are characterized by broad periods of peak fertility, but among Mexican women the age groups are under 20 to 24 years (roughly ages 15-24) whereas in Pakistan, the peak is later, at ages 20-29. A very early peak period, i.e., ages under 20 years is seen for Malaysia, Thailand and Colombia while, for Bangladesh, Dominican Republic, Indonesia, Peru and Sri Lanka, the measures are highest at ages 20-24, indicating peak fertility at moderately early years. It is significant that a peak at ages as advanced as 25-29 years is observed only for Nepal where, as noted several times previously, the wide prevalence of adolescent marriage tends to suppress fertility among young women.

Table 2.10a Mean number of children born in the past five years to women continuously married during this interval by current age, and mean number of living children five years ago

Current Age	Bangladesh		Mexico		Peru		Colombia		Costa Rica		Panama		Nepal		Indonesia		Korea Rep.	
	N	X̄	N	X̄	N	X̄	N	X̄	N	X̄	N	X̄	N	X̄	N	X̄	N	X̄
Under 20	317	1.3	30	2.1	24	2.1	14	(2.3)	...	...	...	...	139	0.8	84	1.4	0	0.0 c/
20-24	1067	1.6	395	2.1	331	2.2	179	1.9	152	1.6	152	1.9	801	1.5	751	1.5	54	1.9
25-29	999	1.5	863	1.9	733	1.8	424	1.6	382	1.2	392	1.4	1045	1.6	1158	1.4	581	1.8
30-34	702	1.3	887	1.6	750	1.4	429	1.2	445	0.9	502	1.0	796	1.5	1169	1.2	977	1.3
35-39	557	1.0	844	1.3	794	1.2	391	1.0	413	0.6	393	0.7	653	1.2	1190	0.8	943	0.7
40-44	478	0.6	653	0.7	664	0.7	339	0.6	335	0.5	317	0.4	603	0.8	981	0.5	749	0.4
45-49	340	0.3	517	0.3	554	0.3	263	0.2	300	0.2	261	0.1	381	0.3	699	0.2	523	0.1
Total	4460	1.2	4190	1.3	3850	1.2	2039	1.2	2027	0.8	2017	0.9	4418	1.3	6042	1.0	3827	0.9
Standardized total a/		1.1		1.4		1.3		1.1		0.8		0.9		1.2		1.0		1.0
Mean number of living children five years ago b/		2.8		3.8		3.3		4.3		3.8		3.6		2.0		2.7		3.0

Notes:

... Data not available in the published report.
( ) Twenty or fewer cases.
a/ Standardized on the "overall" distribution of twelve countries (without Costa Rica, Panama and Fiji).
b/ Partly estimated.
c/ No cases reported.

Sources:

See footnote 9 to this chapter.

Table 2.10b Mean number of children born in the past five years to women continuously married during this interval by current age, and mean number of living children

Current age	Pakistan		Dominican Republic		Malaysia		Fiji		Thailand		Sri Lanka	
	N	X̄	N	X̄	N	X̄	N	X̄	N	X̄	N	X̄
Under 20	46	1.2	12	(1.7)	10	(3.0)	256	1.9	6	(1.2)	14	(1.7)
20-24	524	1.8	145	2.1	283	2.1			184	1.1	330	1.8
25-29	784	1.8	248	1.8	789	1.7	811	1.4	529	0.8	828	1.5
30-34	757	1.6	231	1.5	966	1.3	1540	0.9	515	0.8	1004	1.2
35-39	573	1.2	269	1.3	982	1.0			518	0.6	981	0.9
40-44	554	0.8	163	0.7	743	0.5	936	0.3	489	0.4	774	0.4
45-49	430	0.2	152	0.2	731	0.1			380	0.2	755	0.2
Total	3668	1.3	1220	1.3	4504	1.0	3543	0.9	2521	0.6	4686	0.9
Standardized Total a		1.3		1.3		1.2		1.0		0.7		1.0
Mean number of living children b/		4.0		4.7		4.7		4.3		4.2		4.2c/

Notes: ... Data not available in the published report.

( ) Twenty or fewer cases.

a/ Standardized on the "overall" distribution of twelve countries (without Costa Rica, Panama and Fiji).

b/ Partly estimated.

c/ The heading of the table in the published report reads "by number of living children 5 years ago", but obviously should read "by number of living children"

Sources:

See footnote 9 to this chapter.

For all women, the mean ranges from 0.6 in Thailand to 1.3 in Mexico and Nepal, the standardized overall mean ranges from 0.7 in Thailand to 1.4 in Mexico.

Number of living children

Considerable interest surrounds the question of whether the number of children that a woman has is related to her current fertility. Logically, if women were to stop childbearing upon attaining desired family size, one would expect to find that the smaller the number of children living at the beginning of that period, the larger the mean number of children born during the five year period. The mean number of children born in the past five years to women currently aged 25 to 29 by number of living children five years ago is shown in table 2.11. There the expected relationship is found for Korea, Panama, Costa Rica and Indonesia, but is not sees in the figures for Mexico, Peru, Colombia, Bangladesh and Nepal, which suggests that, for the latter group of countries, more intensive analysis should be undertaken at a future date to determine whether larger numbers were wanted or whether there was a greater tendency to exceed desired family size.

Child mortality may influence fertility and decisions about family size but, for a variety of reasons, evidence of variations in child mortality, may not be interpreted as being necessarily a cause of observed cross-national variations in fertility and family size perferences. There is a link, however, and it is for this reason that data on the survival of children ever born are presented here.

One difficulty with studies of the relationship between fertility and mortality is that the effect of mortality on fertility is not isolated from the reverse and sometimes stronger effects of fertility on mortality. 14/ Even data associating the fertility of women with their own child mortality experience do not disentangle this complex relationship. The figures calculated from the standard recode tapes of Colombia, Panama and Sri Lanka show that within each marriage duration group, those with a child death consistently demonstrated higher cumulative fertility, and the greater the number of deaths the higher the fertility. This positive relationship holds within all marriage duration groups and for each of the three countries. 15/

14/ See for instance: D. Nortman, "Parental age as a factor in pregnancy outcome and child development", Reports on Population/Family Planning, No. 16, Population Council, New York, 1974; J.D. Wray, Population pressure on families: family size and child spacing", In National Academy of Sciences, Rapid Population Growth: Consequences and Implications, Baltimore and London, Johns Hopkins Press, 1971, p. 403-461.

15/ United Nations, Selected Factors Affecting Fertility and Fertility Preferences in Developing Countries (in press).

Table 2.11 Mean number of children born in the past five years to women currently aged 25 to 29 and continuously married during this interval, by number of living children five years ago

Number of children five years ago	Bangladesh		Mexico		Peru		Colombia		Costa Rica		Panama		Nepal		Indonesia		Korea Rep.	
	N	$\overline{X}$	N	$\overline{X}$	N	$\overline{X}$	N	$\overline{X}$	N	$\overline{X}$	N	$\overline{X}$	N	$\overline{X}$	N	$\overline{X}$	N	$\overline{X}$
0	78	1.4	122	1.9	...	1.9	65	1.6	81	1.4	64	1.7	314	1.5	225	1.5	209	2.1
1	208	1.5	188	1.8	...	1.8	110	1.8	118	1.2	105	1.4	384	1.7	395	1.4	255	1.7
2	300	1.5	253	1.9	...	1.8	101	1.4	95	1.1	91	1.5	239	1.7	342	1.4	100	1.4
3	255	1.5	184	1.8	...	1.7	73	1.6	50	1.0	75	1.3	88	1.6	136	1.4	(15)	(0.9)
4	122	1.4	84	1.9	...	1.8	44	1.3	26	1.0	41	1.3	20	(1.9)	47	1.2	(1)	(1.0)
5 or more	36	1.6	32	2.0	...	1.8	31	1.8	(12)	(0.7)	(16)	(0.9)	(0)	(0.0) a/	(15)	(1.1)	(1)	(0.[illegible]) a/
Total	999	1.5	963	1.9	733	1.8	424	1.6	382	1.2	392	1.4	1045	1.6	1158	1.4	581	1.8
Mean number of living children five years ago b/	2.3		2.0		1.8		2.1		1.6		1.9		1.2		1.5		0.9	

Notes:

... Data not available in the published report.
( ) Twenty or fewer cases
a/ No cases reported.
b/ Partly estimated.

Sources:

See footnote 9 to this chapter.

Utilizing similar data and methodology, some researchers have concluded that the observed positive relationship validated the "child survival hypothesis". 16/ As has been mentioned, such findings are insufficient evidence for such a conclusion since, among other things, the influence of fertility on mortality has not been eliminated. The positive relationship between the number of child losses experienced and the number of children ever born reflects, at least in part, the fact that more children ever born represent a larger number of potential child losses. Moreover, the mortality experiences are cumulated over a long period and to women of widely differing ages even within the same marriage duration group.

Fertility preferences: desire to cease childbearing

If a respondent's stated fertility preferences are related in some way to her eventual fertility, then information on fertility preferences should have a certain predictive value, useful in forecasting the future course of fertility. Studies of this phenomenon in developed countries seem to have confirmed this as a possibility. 17/ But it has not been established whether this is also true for developing countries, in many of which there is a high degree of fatalism and belief in divine influence on conception. There is some question also as to the validity of results obtained from analyses of data on attitudes, such as ideals and preferences with regard to family size, additional children wanted or sex of children yet to be born. As phrased in the schedules, the questions are very hypothetical and frequently foreign to thinking in the cultural and social settings of women in many developing countries. Even if such were not the case, it is conceivable that answers given by women about their fertility preferences would have no predictive value, because their stated preferences are an expression of current intentions only, and these could be altered with a change in any of several of her circumstances. 18/ In addition, her preferences may not coincide with her husband's and any such differences could be important in societies where husbands make major family decisions. 19/

16/ Wyon, J.B. and J.E. Gordon, The Khanna Study, Cambridge, 1971; J.A. Harrington, "The effect of high infant and childhood mortality on fertility: The West African Case", Concerned Demography, vol. 3, pp. 22-35, 1971.

17/ See for instance: United Nations, Fertility and Family Planning in Europe Around 1970: A Comparative Study of Twelve National Surveys, (United Nations publication Sales No. E.76.XIII.2) New York, 1976.

18/ For an extensive discussion, see H. Ware, Ideal Family Size, World Fertility Survey, Occasional Papers, No. 13, October 1974.

19/ For a fuller discussion, see United Nations, Selected Factors Affecting Fertility and Fertility Preferences in Developing Countries (in press).

Fertility preferences are measured from the WFS survey data by two sets of questions. One asks about the desire for more children, the other inquires about the total number of children desired. Here, only findings on the first of these two measures will be discussed. Problems in the interpretation of the question on desired family size, as well as space limitations precluded a fuller discussion of fertility preferences. It has been reported that results from the WFS surveys support the view that there is a large unmet need for family planning services based on the evidence that a large proportion of respondents want to cease childbearing (but are not using contraceptives). 20/

Number of living children

The percentage of currently married "fecund" women, who do not want more children, by number of living children as reported in the First Country Reports, is given in table 2.12. There is no doubt that the desire to cease childbearing, as indicated by these data, is surprisingly high, ranging from 30 per cent in Nepal to 72 per cent in Korea. In all countries, there is a strong positive association between the proportion wanting to stop childbearing and current family size. A majority of the women with four living children in all countries report that they do not want any more; the range is substantial, from 52 per cent in Malaysia to 92 per cent in Korea. 21/

In most countries, childlessness, or even the one child family is clearly regarded as undesirable. But, in Bangladesh, Korea and Mexico, 10 to 13 per cent of women with no living children also reported that they wanted no more children, and in Peru and Colombia almost 20 per cent of women with only one child stated that they wanted no more. In the case of Bangladesh, the explanation lies partly in the nature of the question, which was posed as, "Do you want to have another child soon?" instead of "Do you want another child sometime?", 22/ as was asked in other countries. The high figures in table 2.11 raise the possibility that the question might have been misunderstood by respondents in some other countries as well and that, as has been found in some other fertility surveys, women who responded negatively to this question interpreted the question to mean in the near future. 23/

20/ L-J. Cho, "Fertility preferences in five Asian countries", *International Family Planning Perspectives and Digest*, vol. 4, No. 1, Spring 1978; M. Kendall, "The World Fertility Survey: Current Status and Findings". Editor's Summary, *Population Reports*, Special Topics Monographs, Series M, 3, July 1979.

21/ The importance of this relationship is substantiated in a multivariate analysis of factors affecting the desire for another child using the standard recode tapes for Sri Lanka, Panama and Colombia. In this analysis, it was found that the number of living children was more important than education, years since first marriage and the sex composition of living children in explaining variation in a woman's desire for more children. For a full discussion, see United Nations, *Selected Factors Affecting Fertility and Fertility Preferences in Developing Countries* (in press).

22/ M. Kendall, "The World Fertility Survey: Current status and findings", *op. cit.*, p. M-83.

23/ H. Ware, *Language Problems in Demographic Field Work in Africa: The Case of the Cameroon Fertility Survey*, Scientific Report, World Fertility Survey (London, 1977).

Table 2.12 The percentage of currently married "fecund" women who do not want more children by number of living children

Living children	Bangladesh[a/]	Mexico	Peru	Colombia	Costa Rica	Panama	Thailand	Nepal	Indonesia	Korea	Pakistan	Dominican Rp.	Malaysia	Fiji	Sri Lanka
0	13.3	9.8	6.3	9.0	5.3	7.7	5.4	1.3	4.0	12.5	2.0	3.1	0.4	2.1	2.2
1	42.5	10.0	19.9	19.0	13.0	12.0	18.7	5.2	9.1	13.0	7.0	10.5	3.5	6.7	14.2
2	56.4	42.4	48.2	52.0	35.2	42.0	46.1	23.4	28.5	65.6	30.0	33.3	21.4	34.0	49.6
3	66.4	53.5	62.2	65.0	58.9	72.6	64.1	39.4	45.0	85.8	48.0	54.0	31.1	48.5	72.7
4	76.7	69.4	74.2	79.0	68.4	81.7	81.3	58.0	57.4	92.0	69.0	61.6	51.9	66.6	86.9
5	84.5	77.2	80.1	78.0	74.7	85.1	90.4	66.3	68.3	95.3	87.3[b/]	72.1[b/]	78.3[b/]	82.6[b/]	92.5[b/]
6	90.3	81.6	80.7	85.0	77.8	86.7	90.5	80.5	77.7	96.2	...	...	...	...	...
7	92.4	86.3	87.2	93.0	77.3	86.4	95.9	88.0	87.1	99.1	...	...	...	...	...
8	90.6	89.0	88.1	89.0	86.7	86.6	92.9	88.9	84.1	100.0	...	...	...	...	...
9 or more	96.0	91.1	94.7	90.0	95.0	88.5	97.3	(92.9)	93.9	(100.0)	...	...	...	...	...
Total	60.8	57.1	61.4	61.0	52.0	63.0	56.9	29.6	38.8	71.6	49.0	44.7	42.7	49.5	61.4
Estimated median parity level (number of children) at which 50 per cent of the women do not want more children	1.5	2.7	2.1	1.9	2.6	2.3	2.2	3.6	3.4	1.7	3.1	2.8	3.9	3.1	2.0

Notes:
... Data not available in the published report.
( ) Twenty or fewer cases.
a/ In Bangladesh, some women were asked, "Do you want to have another child soon?" instead of Do you want to have another child sometime?"
b/ Five or more children.

Sources:

See footnote 9 to this chapter.

Another explanation for the relatively high figures in table 2.12 could be that, in accordance with the questionnaire design, among the currently married women, the question on desire for more children was not put to women who had been sterilized or whose husbands had been sterilized for medical or contraceptive reasons; they were assumed to have responded negatively to it. Also, women who subjectively felt that they were infecund (for unspecified reasons) were not asked their desire for more children. Thus the questionnaire omits the group of women who might desire more children but for whom having an additional child would be difficult or impossible because of possible biological impairments. This procedure could have upwardly biased the proportion not wanting more children.

The manner in which currently pregnant women were processed may also have introduced an upward bias. Because currently pregnant women were treated as if they had already achieved the next parity, the desire to cease childbearing is exaggerated, especially for women with 0-3 children where the largest proportion of currently pregnant women are located. The procedure of mixing currently pregnant women (Parity X-1) with women who already have X number of living children(Parity X) assumes that there will be no spontaneous or induced abortions, or still-births among those who experience either foetal loss or an infant death, a certain proportion of whom would want to replace that loss and continue childbearing.

An alternative method of determining the percentage of women who did not want any more children has been illustrated using data for Korea. 24/ It is based upon the question about number of children desired. Accordingly, information from that question was cross-classified with number of children living. It was then possible to determine those who had not achieved desired family size, those who had the exact number wanted and those who had more than was presumably desirable. The latter two categories of women constituted the group that did not want any more children. Measured in this way, the proportions at each parity wanting no more children was considerably less than when determined by the proprotion of women who stated that they did not want more children.

24/ "Report on Monitoring of Population Trends", (United Nations document E/CN.9/XX/CRP.1), 24 January 1979, pp. 127-128.

Distribution of currently married Korean women who want no more children by parity

Number of children living	Measured by ratio of number of children desired to number living a/	Measured by number who stated they wanted no more children b/
0	0.6	12.5
1	3.4	13.0
2	38.0	65.6
3	72.8	85.8
4	89.7	92.0
5	97.1	95.3
6	96.9	96.2
7	99.4	99.1
8	97.6	100.0
9+	97.6	100.0
Total	61.0	71.6

Sources: a/ "Report on Monitoring of Population Trends" (United Nations document E/CN.9/XX/CRP.1) January 1979, pp. 127-128.

b/ Table 2.11.

Age and marital duration

The data in table 2.13 suggest, as would be expected in view of the relationships between a woman's age, marital duration and parity, that, in general, the proportions of women wanting no more children rise with increasing age or years since first marriage. Further, in nine countries, well over one-half of the currently married "fecund" women aged 25-34 and with three living children wanted to cease childbearing. In five of them (excluding Bangladesh for which the data are not comparable) the figures range from 60-84 per cent. This is found also when marriage durations of less than 20 years were examined. In Peru, Malaysia, Fiji, Sri Lanka, Nepal and Indonesia, the percentage of women wanting to stop childbearing does not differ very much between the two youngest age groups; a substantial increase in the percentage starts with women aged 34-44. In the Dominican Republic, Colombia and Thailand, finally, there is no clear relation between the desire to cease childbearing and age or years since first marriage. This suggests that, in a majority of cases, women do not wish to bear children throughout their reproductive years, but would cease as soon as they have the number wanted, no matter how young they are or how few years they have been married.

Table 2.13 The percentage of currently married "fecund" women with three living children who do not want more children, by current age and number of years since first marriage

Current age and years since first marriage	Bangladesh[a]		Pakistan		Mexico		Dominican Republic		Peru		Colombia		Costa Rica		Panama	
	N[b]	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Current age:																
Under 25	317	62	155	31	245	44	83	52	193	60	107	68	60	45	70	59
25-34	353	66	337	46	360	54	84	54	383	58	214	63	205	55	232	73
35-44	77	79	113	64	94	71	35	51	163	70	84	67	89	73	94	78
45 or more	19	(100)	40	92	13	(85)	9	(89)	32	77	15	(47)	28	75	24	87
Total	765	66	646[c]	48	712	53	211[d]	54	711	62	420	65	382	59	420	73
Years since first marriage:																
Less than 10 years	...	...	...	39	486	49	124	52	...	61	237	64	182	52	188	66
10-19 years	...	...	...	42	192	62	65	57	...	61	146	68	150	63	176	78
20 years or more	...	...	...	...	34	77	22	55	...	75	37	57	40	75	56	79
Total	765	66	646	48	712	53	211	54	771	62	420	65	382	59	420	73

Demographic characteristics	Malaysia		Fiji		Thailand		Sri Lanka		Nepal		Indonesia		Korea, Rep. of	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Current age:														
Under 25	168	22	132	42	70	71	128	66	139	36	206	36	30	57
25-34	459	25	414	44	230	60	488	69	477	35	574	40	651	84
35-44	162	52	114	71	92	70	214	80	157	52	173	62	251	94
45 or more	27	59			6	(50)	26	100	26	55	37	88	10	(100)
Total	816[d]	31	660	48	398[d]	64	856	73	799	39	990	45	942	86
Years since first marriage:														
Less than 10 years	459	24	371	43	203	66	389	66	166	38	309	36	519	80
10-19 years	263	37	220	47	156	63	365	75	466	34	489	43	356	92
20 years or more	93	49	69	84	41	63	80	94	167	56	191	64	67	96
Total	815	31	660	48	400	64	835	72	799	39	989	45	942	86

Notes:

... Data not available in the published report.

( ) Twenty or fewer cases.

[a] In Bangladesh, some women were asked, "Do you want to have another child soon?", instead of "Do you want to have another child sometime?"

[b] N in this table refers to the number of women upon which the percentage is based.

[c] Includes "other fecund".

[d] Excludes sterilized couples.

Sources:

See footnote 9 to this chapter.

Socio-economic factors

If the factors that influence a woman's desires about future childbearing were the same as those that influence cumulative fertility, one would expect the following: the percentage of currently married "fecund" women who desire to stop childbearing would rise with increasing levels of education, would be higher in urban than rural areas, and would be greater among women whose husbands are professionals or other white collar workers and lower for women, whose husbands have agricultural occupations; it would be higher for women who ever worked since marriage than for those who never worked.

In general, the results in table 2.14 follow the expected pattern, except that the educational level attained was not a very closely associated variable in Fiji and, in some countries, women who had never gone to school wanted no more children in greater proportions than did those who had graduated from primary school. The findings for Fiji reflect the socio-economic and fertility characteristics of the two ethnic groups which, when pooled, do not give a representative picture of either. An explanation of the differential between women with primary and no education require more intensive analysis.

With the exception of Thailand and Indonesia, in all countries women living in urban areas showed a greater desire to stop childbearing than did women living in rural areas. As expected, in most countries the desire to cease childbearing is greater among women whose husbands are professionals and lower for those whose husbands have agricultural occupations but, again, there are exceptions. Regarding wife's pattern of work, substantial differences in the percentages between women who ever worked since marriage and those who never worked are found for Thailand and Costa Rica and, to a lesser extent, also for Indonesia and Mexico. In all cases, except Fiji, Indonesia and Korea, the lowest proportion of third-parity fecund, married women desiring to cease childbearing were among those who had never worked. There was not a systematic difference between women who had ever worked since marriage and those who had worked before marriage only.

Child mortality experience

A discussion of the differential cumulative fertility of women in Colombia, Panama and Sri Lanka according to their child mortality experience is presented in detail, above. It would be helpful if, in support of the discussion, an assessment could be made of cross-national variations in the relationship between experience of a child death and a woman's desire

Table 2.14 The percentage of currently married "fecund" women with three living children who do not want more children, by selected background characteristics

Background Characteristic	Bangladesh a/	Pakistan	Mexico	Dominican Rep.	Peru	Colombia	Costa Rica	Panama	Malaysia	Fiji	Thailand	Sri Lanka	Nepal	Indonesia	Korea Rep.
Level of education															
No educ.	64	47	48	(50)	58	53	(57)	75	32	55	54	66	39	51	87
Primary	73	59	51	53	60	68	55	67	29	46	66	73	51	37	82
More than primary	68	68	65	62	69	63	69	78	45	48	(75)	75	(100)b/	48	91
Total	66	48	53	54	62	65	59	73	31	48	64	73	39	45	86
Type of place of residence															
Urban	74	53	....	55	69	67	64	76	49	59	56	76	...	43	90
Rural	66	47	...	53	57	59	52	71	27	42	65	71	...	45	79
Total	66	48	53	54	62	65	59	73	31	48	64	72	39	45	86
Occupational status of husband occupational code:															
1	...	...	61	(65)	...	...	...	81	43	55	48	77	...	45	93
2	...	...	61	48	...	...	...	68	32	50	75	74	...	42	92
3	...	...	45	57	...	...	...	62	25	39	66	71	...	46	76
4	...	...	52	51	...	...	...	78	30	53	59	75	...	44	88
5	...	...	(62)	(50)	...	...	...	(70)	39	49	(75)	66	...	(43)	75
Total	66	48	53	54	62	65	59	73	31	48	64	73	39	45	86
Wife's pattern of work work pattern code:															
1	...	...	59	...	63	...	65	74	32	49	66	74	...	48	84
2	...	...	52	...	66	...	61	74	34	47	48	78	...	39	85
3	...	...	50	...	55	...	47	69	29	49	(47)	71	...	39	90
Total	66	48	53	54	62	65	59	73	31	48	64	73	39	45	86

Notes: ... Data not available in the published report.

( ) Twenty or fewer cases.

a/ In Bangladesh some women were asked, "Do you want to have another child soon?", instead of "Do you want to have another child sometime?"

b/ Only one case reported.

Occupational status of husband code:
1 - Professional, managerial, technical, clerical
2 - Sales and service 3 - Agricultural
4 - Skilled manual 5 - Unskilled manual

Wife's pattern of work code:
1 - Ever worked since marriage
2 - Before marriage only
3 - Never worked

Sources: See footnote 9 to this chapter.

to cease childbearing. Such an assessment would not be hampered by problems relative to differences between desires and behaviour and impediments that individuals may encounter when they attempt to behave in accordance with their desires. Because data for such an assessment are available only from the data tapes, information for Colombia is offered here for illustrative purposes.

It was found that, in Colombia, at a given effective family size, the proportion of women who desire to cease childbearing is not necessarily greater if they had experienced a child death than if they had not. However, the desire of women to cease childbearing at a given number of children ever born, varies significantly in relation to the women's differential child mortiality experience, women with such experience showing substantially less readiness to cease childbearing. It seems that women in Colombia intend to have a certain number of children and, if any die, they attempt to have a replacement birth. Of course, a different pattern of behaviour may be found for other WFS countries and, in the future, analysis of data for these countries will be undertaken.

Sex Preferences for Children

Preferences in regard to the sex of children are known to exist in some countries. In developing countries, the preference is most often for sons, because family values emphasize their importance for economic, lineage or religious reasons. Existence within a culture of a preference for children of one sex and the strength of the preference can influence completed family size. Consider a society in which women would voluntarily stop childbearing only when they had achieved the sex composition that they desired. Or, consider the implications of three types of sex preferences: 1) a certain minimum number of boys, such as two; 2) a balance, with at least one boy and one girl; and 3) a combination of balance and male preference, i.e., the parents would ideally like to have two boys and one girl. 25/

As noted in the report on the survey in Sri Lanka, a child has nearly as much of a chance of being a girl as it has of being a boy, particularly if foetal mortality is taken into account. Thus, each of the three types of sex preferences leads to a certain average number of children required:

25/ This example was taken from World Fertility Survey, Sri Lanka, 1975, First Report, op. cit., p. 118.

four in the first case, three on the average in the second and 4.5 children in the last case. 26/ The relation between the number and sex of children preferred is not as simple as in the example above, where the total number would depend on the achievement of the desired sex composition. 27/

The WFS did not ask for a sex breakdown of the total number of children desired. Therefore, sex preference can be measured by: a) the percentage who want no more children at all, while having current combinations of living sons and daughters; b) the preferred sex of the next child, given the sex of those already born and living; c) the dependence of the mean additional number of children wanted on the current combination of sons and daughters. Because of space constraints, only the findings for the first two of these measures will be discussed here. 28/

Desire to cease childbearing by number of living children and sons

Tabulations in the WFS first country reports relative to sex preference are not adequate for present purposes, and restrictions as to length of text do not permit an elaboration of the constraints posed by the data. However, consistent with Freedman and Coombs, 29/ inferences about sex preferences from statements about future childbearing may be based on the following conventions: If, at given parities, the per cent wanting no more children is higher among those with one or two sons than it is among those with no sons, and if the percentage among those with two sons is higher than among those with one, these relationships are considered to be consistent with a perference for sons. At the same time, it will be taken that there is a preference for girls if the per cent who want no more children is greater for those with no sons than for those with one or two.

26/ Cf. M.C. Sheps, "Effects of family size and sex ratio of preference regarding the sex of children", Population Studies, vol. XVII, No. 1 (July 1963), pp. 66-72. For a careful study, see R. Freedman and L.C. Coombs, Cross-Cultural Comparisons: Data on Two Factors in Fertility Behaviour. Occasional Paper of the Population Council, 1974.

27/ See, for discussion, Coombs, L.C., "Are cross-cultural preference comparisons possible? A measurement-theoretic approach". International Union for the Scientific Study of Population, IUSSP papers, No. 5, (1975).

28/ As mentioned in the introduction to section C, problems of interpretation limit the use of information derived from questions on desired family size.

29/ Op. cit., p. 26.

Couples may also want to have at least one son and one daughter. Because the open ended category of three or more children gives no precise information about the number of daughters born to women of third parity and higher, a preference for balance can be inferred from the data in table 2.15b only in one set of circumstances: "if, at second parity, the per cent wanting no more children is greater for those with one son (and one daughter) than for those with no son or two sons", as specified by Freedman and Coombs. 30/

In tables 2.15a and 2.15b, the percentage of currently married "fecund" non-pregnant women who do not want more children by number of living children and living sons is given. It is quite apparent that, in all countries, the sex composition of the living children influences women's desire for another child. Applying the definitions mentioned above, the data show the existence of a fairly strong preference for sons in Pakistan, Bangladesh, Nepal and Korea. In Pakistan, for example, 44 per cent of second parity women with two living sons want no more children as compared with 35 per cent of those with one son, and only 12 per cent of those with no sons.

In these countries, the proportion of third parity women with no sons who want to stop childbearing is lower than the proportion of second parity women with at least one son. This may be an indication that the motivation of women to have no more children in these countries could be more strongly affected by the achievement of a satisfying sex preference than by the preference regarding the number of children wanted. In Malaysia, Fiji, and Thailand, a mild preference for sons as well as a mild preference for balance is seen. In Fiji, for example, second parity women who have one child of each sex are more willing to stop childbearing than are those who have only boys or only girls and among the second parity women with children of one sex only, the percentage of women who want to stop childbearing is somewhat higher for women with two sons than for those with two daughters. In Panama, Sri Lanka and Indonesia, women have a fairly strong, and in the remaining other countries, a milder preference for balance. 31/ Especially from the data for the Latin American countries, the impression may be gained that the motivation of women to have no more children is more strongly affected by the achievement of a satisfying number of children wanted than by the preference regarding the sex of children.

30/ *Op. cit.*, p. 26.

31/ In Costa Rica besides a mild preference for balance, even a preference for girls seems to exist among second parity women.

Table 2.15a The percentage of currently married "fecund" non-pregnant women who do not want more children, by number of living children and number of living sons

Number of living children + sons	Bangladesh N	Bangladesh %	Mexico N	Mexico %	Peru N	Peru %	Colombia N	Colombia %	Costa Rica N	Costa Rica %	Nepal N	Nepal %	Indonesia N	Indonesia %	Korea, Rep. N	Korea, Rep. %
None	727	13	235	10	...	6	139	9	95 5	5	938	1	685	4	168	12
One child																
no son	411	48	240	10	...	23	151	19	173	16	391	4	572	10	230	12
one son	341	52	248	9	...	18	169	21	180	11	445	7	543	9	267	17
Two children																
no son	147	50	139	32	...	46	95	45	94	38	170	10	252	32	112	36
one son	358	67	339	41	...	50	206	53	248	35	368	27	552	35	361	71
two sons	187	69	176	37	...	42	106	49	117	32	217	33	229	18	244	77
Three children																
no son	94	56	69	43	...	56	38	53	40	47	777	10	90	35	60	47
one son	216	67	224	48	...	63	139	61	130	59	255	36	342	51	252	82
two sons	264	80	239	62	...	67	145	68	137	58	249	54	310	50	402	96
three sons	79	70	75	49	...	57	33	52	42	55	103	42	105	32	128	94
Four or more children																
no son	45	68	47	65	...	75	26	31	19	(58)	46	7	92	55	47	51
one son	261	65	250	71	...	70	112	84	124	78	197	56	317	68	308	83
two sons	452	85	512	75	...	79	250	84	207	71	332	68	534	68	567	98
three sons	517	92	530	79	...	79	290	81	238	79	303	80	504	72	437	99
four or more sons	534	90	741	85	588	87	424	86	378	81	219	79	500	79	268	100
Total	4,632	64	4,064	56	3,851	61	2,323	61	2,222	52	4,310	30	5,628	40	3,851	74

Notes:

... Data not available in the published report.
( ) Twenty or fewer cases.

Sources:

See footnote 9 to this chapter.

Table 2.15b. The percentage of currently married "fecund" non-pregnant women who do not want more children, by number of living children and number of living sons

Number of living children and sons	Pakistan		Dominican Republic		Panama		Malaysia		Fiji		Thailand		Sri Lanka	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
None or one child														
no son	818	4	220	6	232	9	516	2	564	4	378	12	733	9
one son	287	11	91	12	141	11	281	4	258	8	239	21	396	14
Two children														
no son	109	12	47	30	76	34	144	15	101	23	93	33	176	39
one son	259	35	83	22	210	49	371	25	311	36	230	51	393	50
two sons	146	44	53	28	109	34	180	17	138	30	118	42	205	41
Three or more children														
no son	67	14	30	40	73	68	114	17	40	34	551	63	147	56
one son	405	44	126	59	277	73	522	40	440	58	257	69	550	82
two sons	646	77	159	63	412	82	800	59	651	71	338	84	821	88
three or more sons	1,094	90	356	69	727	85	1,335	74	1,083	79	341	89	1,285	90
Total	3,831	50	1,164	43	2,257	63	4,263	43	3,635	50	2,245	55	4,706	52

Notes:

... Data not available in the published report.
( ) Twenty of fewer cases.

Sources:

See footnote 9 to this chapter.

Preferred sex of the next child by sex of those already born and living

If, in a society, women have a preference for at least one child of each sex, the sex of the first child should not be so important and a strong sex preference should first be seen for the second child, to complete the balance. A question on sex preference for the next birth could be answered with "boy", "girl" or "either", so that one would expect the one-third of the women who have a preference for balance would by chance prefer that their first child be a boy. In table 2.16a and 2.16b it is seen that, in these countries, the proportion of childless women preferring their first child to be a boy ranges from 21 per cent in Costa Rica to 99 per cent in Nepal. On the other hand, a preference for balance exists in Mexico, Peru and Indonesia, while in Costa Rica there is some evidence of a preference for girls among childless women.

At a given parity in all countries, the proportion of women preferring their next child to be a boy decreases with increasing number of sons, thus indicating that there does not exist in any of these countries a stated preference for sons to the exclusion of daughters. In Korea, Nepal, Pakistan and Bangladesh, however, the decrease in the proportion of women preferring their next child to be a boy with increasing number of sons becomes substantial only when the women have at least two sons.

Table 2.16a. Among currently married "fecund" non-pregnant women who want another child and stated a sex preference, the proprotion preferring a boy, by number of living children and number of living sons

Number of living children + sons	Bangladesh		Mexico		Peru		Colombia		Costa Rica		Nepal		Indonesia		Korea, Rp.	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
None	564	62	210	32	...	36	99	62	88	21	744	99	640	30	146	60
One child																
no son	183	84	214	72	...	71	101	90	144	68	347	99	476	67	201	94
one son	131	32	225	10	...	7	114	8	156	11	255	73	448	4	220	26
Two children																
no son	64	95	94	72	...	88	47	94	56	80	149	99	159	79	69	100
one son	84	67	199	34	...	37	74	47	148	20	179	97	306	30	100	80
two sons	46	15	110	6	...	5	49	2	79	5	96	32	162	2	56	2
Three children																
no son	37	97	35	71	...	81	16	100	20	(95)	71	100	49	79	31	100
one son	47	62	117	67	...	71	42	90	51	57	118	100	120	59	43	100
two sons	34	49	92	14	...	9	39	15	53	11	55	73	113	10	113	23
three sons	20	(6)	38	3	...	10	14	(0)	18	(6)	41	10	59	3	8	(12)
Four or more children																
no son	12	(100)	16	(88)	...	71	3	(100)	8	(63)	44	100	25	87	22	100
one son	27	87	71	72	...	48	14	(100)	24	79	57	98	58	57	48	100
two sons	32	45	128	48	...	44	26	58	57	32	40	95	94	24	9	(78)
three sons	18	58	108	25	...	27	35	29	42	29	18	(78)	85	7	3	(67)
four or more sons	25	24	107	12	47	16	34	24	62	16	16	(31)	51	6	1	(0)
Total	1,326	62	1,764	38	1,318	38	707	50	1,006	33	2,230	90	2,855	34	970	66

Notes:

... Data not available in the published report.
( ) Twenty or fewer cases.

Sources:

See footnote 9 to this chapter.

Table 2.16b. Among currently married "fecund" non-pregnant women who want another child and stated a sex preference, the proportion preferring a boy, by number of living children and number of living sons

Number of living children and sons	Pakistan		Dominican Republic		Panama		Malaysia		Fiji		Thailand		Sri Lanka	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
None or one child														
no son	789	75	200	56	211	58	503	63	364	88	322	73	644	69
one son	255	47	76	8	121	8	267	7	187	9	182	3	332	7
Two children														
no son	96	99	29	86	47	85	120	96	70	97	58	100	102	98
one son	169	77	61	30	103	29	279	39	100	69	105	50	120	63
two sons	82	30	36	8	68	3	149	2	81	1	64	2	104	1
Three or more children														
no son	58	100	13	(92)	23	91	94	94	52	100	17	(100)	58	97
one son	228	90	39	74	70	73	302	75	119	96	68	75	69	84
two sons	148	59	52	31	68	38	313	28	111	45	49	37	60	48
three or more sons	106	45	79	20	93	19	330	9	131	5	55	9	74	16
Total	1,931	70	585	40	804	40	2,357	42	1,215	57	920	48	1,563	51

Note: See notes to table 2.16a.

C. Some Factors Affecting Use and Non-Use of Contraceptives

The populations of the developed and developing countries differ, on average, in respect to the relative importance of the principal determinants of fertility, which have been identified as proportion married, contraceptive prevalence, incidence of induced abortion and duration of lactational amenorrhea. 32/ The focus here is the incidence and form of contraceptive practice, in most countries among married women only.

In the modern, industrial societies couples tend to have a clear notion as to the number of children that they want, and the vast majority have the knowledge and means of ensuring that they do not exceed that number. That fertility is more or less uniformly low in these societies attests to the general conformity of reproductive behaviour with family size preference. Conversely, in the more traditional, less industrialized societies, even when couples do have a preference in respect to family size - and, for a variety of reasons, many do not - they are very often unable or unwilling to take the steps required to realize their preference. A question of overriding importance is why preferences are not supported by behaviour.

Fertility is regulated either by natural means (abstinence, sterility, nutrition, breastfeeding, postpartum ammenorrhea, etc.) or by the application of contraceptives, abortion or other birth control methods. Whether a couple or an individual resorts to the application of a birth control technique depends very often, but not invariably, upon the intensity of motivation to restrict births. Only couples or individuals who have as many as or more children than they want or who want more children but at intervals of some desired length can be expected consciously and deliberately to regulate their fertility. This paper seeks to determine the prevalence of contraceptive use and to ascertain which, among a given set of factors, influences whether contraception is practiced and, if so, the type of method applied.

The data upon which the analysis is based were obtained in surveys conducted in 20 developing countries that participated in the World Fertility Survey and in a few developed countries.

32/ John Bongaarts, "The fertility-inhibiting effects of the intermediate fertility variables", Working Papers No. 57, Center for Policy Studies. The Population Council, New York, May 1980. Bongaarts found that the four intermediate variables account for 97 per cent of the variance in fertility levels among 30 developed, developing and historical populations.

Some characteristics of the developing countries for which WFS data are available

The World Fertility Survey (WFS) data utlized in this study were obtained either from First Country Reports 33/ or from the magnetic data tapes that

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33/ World Fertility Survey, Bangladesh Fertility Survey 1975, First Report (Dacca, Government of the Peoples Republic of Bangladesh, Ministry of Health and Population Control, 1978).

Instituto Internacional de Estadistica, Encuesta Nacional de Fecundidad Colombia 1976, Resultatos Generales (Bogotá, 1977).

Dirección General de Estadistica y Censos, Encuesta National de Fecundidad 1976 Costa Rica (San José, 1978).

Consejo Nacional de Poblacion y Familia, Encuesta Nacional de Fecundidad - Informe General (Santa Domingo, 1976).

World Fertility Survey, Fiji Fertility Survey 1974, Principal Report (Suva, Bureau of Statistics, 1976).

Central Bureau of Statistics and World Fertility Survey, Indonesia Fertility Survey 1976, Principal Report Volume I and II (Jakarta, 1978).

World Fertility Survey, The Korean National Fertility Survey 1974, First Country Report (Seoul, Korean Institute for Family Planning, 1977).

World Fertility Survey, Malaysian Fertility and Family Survey - 1974 Frist Country Report (Kuala Lumpur, National Family Planning Board, 1977).

Secretaria de Programacion y Presupuesto, Encuesta Mexicana de Fecundidad, Primer Informe Nacional Volume I and II (Mexico, 1979).

World Fertility Survey, Nepal Fertility Survey, 1976, First Report (Kathmandu, His Majesty's Government, Ministry of Health, 1977).

World Fertility Survey, Pakistan Fertility Survey, First Report, (Lahore, Population Planning Council of Pakistan, 1976).

Oficina de Estudios de Poblacion, Encuesta de Fecundidad, Informe General Panama 1977 (1977).

Instituto Nacional de Planificacion, Encuesta Nacional de Fecundidad de Peru 1977-1978, Informe General (Lima, Direccion General de Censos, Encuesta y Demografia, Direcion de Demografia, 1979).

Department of Census and Statistics, Ministry of Plan Implementation, World Fertility Survey Sri Lanka 1975, First Report (Colombo, 1978).

World Fertility Survey, The Survey of Fertility in Thailand: Country Report Volume I and II (Bangkok, Institute of Population Studies, Chulalongkorn University and Population Survey Division, National Statistical Office, 1977).

World Fertility Survey, Guyana Fertility Survey 1975, Country Report, Volume I and Volume II, (Ministry of Economic Development, 1979).

World Fertility Survey, Jamaica Fertility Survey 1975/76, Country Report, Volume I and Volume II, (Kingston, Department of Statistics, 1979).

World Fertility Survey, Jordan Fertility Survey 1976, Principal Report, Volume I and Volume II, (Aman, Department of Statistics, 1979).

World Fertility Survey, Republic of the Philippines Fertility Survey 1976, First Report, (National Census and Statistics Office, December 1979).

were available as of this writing. The discussion also treats, in less detail, the level of contraceptive use in developed countries that are participating in the WFS and trends in use in developed and developing countries participating in the WFS.

The 20 countries for which WFS data are currently available are:

Africa: Kenya

Asia and Oceania: Bangladesh, Fiji, Indonesia, Jordan, Republic of Korea, Malaysia, Nepal, Pakistan, Philippines, Sri Lanka, Thailand

Latin America: Colombia, Costa Rica, Dominican Republic, Guyana Jamaica, Mexico, Panama, Peru.

While these countries cannot be regarded as representative of all developing countries, this group does include countries of widely varying cultural and economic background. All of these countries were experiencing rapid population growth in the mid-1970's. The estimated rates of natural increase range from approximately two per cent per year to over three per cent per year. 34/ Especially high rates or natural increase (three per cent per year or more, are to be found in Kenya, Jordan, Pakistan, the Philippines, Thailand, the Dominican Republic and Mexico. In many of the countries, a high level of mortality rather than a relatively low level of fertility currently acts to reduce the rate of natural increase below these very high levels. For example, in Bangladesh, Indonesia, Nepal, Pakistan and Peru, life expectancy at birth is estimated to be below 50 years. 35/ This group of countries also includes several with life expectancy at birth of 65 years or more: Jordan, West Malaysia, Sri Lanka, Costa Rica, Jamaica and Panama. 36/ In most of the countries considered in this discussion, there is evidence of a recent decline in fertility, although none yet approaches the low fertility levels of developed countries. In Bangladesh, Nepal, Pakistan and Jordan there is as yet no firm evidence of a fertility decline; it is likely that fertility has been increasing in Kenya. The Total Fertility Rate (TFR) for these 20 countries ranges from an estimated 8 children per woman in Kenya to roughly three and one-half children per woman in Korea and Sri Lanka: 37/

34/ World Population Trends and Policies, 1979 Monitoring Report, Volume I, Population Trends (United Nations publication, in press) chapter 2.

35/ Latest available year. See discussion of mortality levels and trends in this report.

36/ Latest available year. Guyana probably should be included in the "low mortality" group; the latest data-based estimate for Guyana dates from around 1960. See discussion of levels and trends in mortality elsewhere in this report.

37/ Estimates taken from discussion of fertility levels and trends elsewhere in this report.

Total Fertility Rate

6 or more:	Kenya, Bangladesh, Jordan, Nepal, Pakistan, Peru
5.0 - 5.9:	Philippines, Thailand, Dominican Republic, Mexico
4.0 - 4.9:	Fiji, Indonesia, West Malaysia, Colombia, Guyana, Panama
3.0 - 3.9:	Republic of Korea, Sri Lanka, Costa Rica, Jamaica.

Family Planning Policies and Programmes in WFS Countries

Seventeen of the 20 developing countries represented in this analysis had an organized and government-supported family planning programme at the time of the survey, although the amount of support provided and the duration of the programmes vary considerably. The support given to the programmes has been classified as follows: 38/

strong programme:	Fiji, Republic of Korea, Costa Rica, Jamaica
moderate programme:	Indonesia, Malaysia, Philippines, Sri Lanka, Thailand, Colombia, Dominican Republic, Panama
weak programme:	Bangladesh, Nepal, Pakistan, Mexico, Kenya
no official programme:	Jordan, Guyana, Peru.

The lack of an official family planning programme does not necessarily mean that family planning services are unavailable to the population. None of the 20 countries surveyed has a policy of limiting access to modern contraceptive methods. In Guyana, there is no organized family planning programme; "such contraceptive knowledge and use as does exist, therefore, will be essentially the result of personal effort on the part of women and their partners". 39/ Regulations in Peru regarding family planning underwent a change shortly before the survey was conducted. Sterilization for contraceptive purposes was prohibited as were organizations devoted exclusively to fertility control; family planning is required to be totally integrated with other health services. 40/ A number of government-supported clinics now provide

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38/ The items of information that contributed to the ratings are described in R. Lapham and W.P. Mauldin, "National family planning programs; review and evaluation", Studies in Family Planning, vol. 3, No. 3 (March 1972), pp. 29-52. The ratings are in W.P. Mauldin, et. al., "Conditions of fertility decline in developing countries 1965-75", Studies in Family Planning, vol. 9, No. 5 (May 1978), p. 103.

39/ Guyana Ministry of Economic Development, Guyana Fertility Survey 1975 Country Report, vol. I, pp. 53-54.

40/ Annual Review of Population Law 1978 (United Nations Fund for Population Activities, New York, 1979), p. 2.

family planning services, but such services were not widely available in the period preceding the survey. 41/ The Jordanian government supports the Jordan Family Planning and Protection Association, which is responsible for implementing family planning in the country. A number of clinics offer services, and contraceptive pills may be purchased at pharmacies without prescription. 42/

Knowledge of contraception in developing countries

Knowledge of any method

Results of the WFS has shown that the level of awareness of contraception is quite high in most of the countries surveyed to date (table 2.17). In 14 of the 20 developing countries for which information is available, at least 90 per cent of ever-married women of reproductive age had heard of one or more methods, and in all but one country -- Nepal -- at least three-fourths of the women had heard of a modern method. In all countries, the percentage of women who had heard of one or more of the modern 43/ methods -- sterilization, the pill,

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41/ Population Policy Compendium: Peru (United Nations and United Nations Fund for Population Activities, New York, 1979), p. 4.

42/ Family Planning in Five Continents, (International Planned Parenthood Federation, London, 1979), p. 42.

43/ For convenience in discussion, contraceptive methods are classed as modern -- IUD, pill, injectable, sterilization, condom, and female chemical and barrier methods (diaphragm, foam, jelly, etc.) -- and traditional, even though some of the "modern" methods have a long history and although there are some variants of the rhythm method that are of recent origin. (The two method groups are called "efficient" and "inefficient" in the WFS First Country Reports.) The modern group includes the methods most often offered by family planning programmes, though few programmes make all these methods generally available. The modern methods are also distinguished by their requirements for supplies and/or medical attention and by their greater effectiveness at preventing accidental pregnancies. There are few measurements of rates of contraceptive failure in developing countries for methods other than IUDs, pills, injectables and sterilization. Studies of other methods, conducted primarily in developed countries, show wide variations in failure rates, depending at least in part on age and degree of motivation of the groups of users studied. It is quite possible that in some countries particular traditional methods, such as withdrawal, have lower failure rates than some modern methods, particularly the condom and the female barrier and chemical methods. For reviews of effectiveness of various methods, see Population Reports (Baltimore, Md., U.S.A., The Jonns Hopkins University), Series B, No. 3; Series H, Nos. 3, 4 and 5; Series I, No. 1; Series K, No. 1; Series C; Series D, No. 2; Series A, No. 2; A.L. Southam, "Contraceptive Methods: Use, Safety, and Effectiveness" in Berelson et. al., eds., Family Planning and Population Programs (Chicago, University of Chicago, 1966), pp. 385-386; C. Tietze, "The Use-Effectiveness of Contraceptive Methods", in C.V. Kiser, ed., Research in Family Planning, (Princeton, New Jersey, Princeton University Press, 1962), pp. 357-369.

Table 2.17 **Percentage of ever-married women who have heard of specific contraceptive methods, for selected WFS countries**

Country	Number of Women a/	Any method	Any modern b/	Any traditional b/	Sterilization Female	Sterilization Male	Pill	Injection	IUD	Condom	Foam, diaphragm, etc.	Rhythm	With-drawal	Abstinence	Douche	Other
AFRICA																
Kenya c/	8100	88	84	...	54	14	74	55	49	40	20	50	25	45	12	2
ASIA AND OCEANIA																
Bangladesh	6515	82	80	49	53	51	64	...	40	21	10	28	15	11	30	5
Fiji	4928	100	100	87	96	40	98	50	97	83	41 d/	57	56	56	... d/	5
Indonesia	9155	77	75	34	11	8	71	17	50	41	4	12	7	13	3	28
Jordan	3611	97	97	81	79	19	96	...	76	51	21	50	54	33	20	55
Republic of Korea	5430	97	97	68	66	84	94	5	91	75	5	58	37	25	27	2
Malaysia	6318	92	90	61	73		88		40	52	26	38	30	30	...	21
Nepal	5940	23	22	6	13	16	12	0	6	5	0	0	0	5	0	1
Pakistan	4952	75	75	4	7	2	68	13	48	14	7	0	0	2	0	1
Philippines	9268	94	94	79	75	70	90	...	86	88	40	66	65	36	21	4
Sri Lanka	6808	91	90	56	82	38	79	43	62	51	11	44	20	31	9	3
Thailand	3820	97	96	55	87	70	92	70	85	48	21	31	22	36	17	1
LATIN AMERICA																
Colombia	3302	96	95	74	72	38	90	71	82	60	56	56	47	28	41	9
Costa Rica e/	3037	100	100	91	94	67	98	88	92	91	71	81	67	31	60	7

Table 2.17 (continued)

Country	Number of women a/	Any method	Any modern b/	Any traditional b/	Sterilization Female	Sterilization Male	Pill	Injection	IUD	Condom	Foam, diaphragm, etc.	Rhythm	With-drawal	Abstin-ence	Douche	Other
LATIN AMERICA (cont'd)																
Dominican Republic	2256	98	98	75	95	30	92		78	72	70	43	56	——	6	——
Guyana	3616	95	95	71	78	22	78	38	79	73	45	46	48	32	36	10
Jamaica	2765	98	98	78	88	40	95	87	85	90	67	39	59	38	43	3
Mexico	6255	90	89	63	68	38	83	68	75	42	20	48	47	... f/	38	4
Panama e/	3203	99	98	86	93	64	95	26	89	76	56	66	61	35	62	4
Peru	5639	82	78	69	60	19	63	61	42	40	31	55	40	24	47	11

Notes:

a/ Unless otherwise indicated, based on women aged under 50 or 15-49 evermarried or in a union.
b/ Modern methods include sterilization, pill, injection, IUD, condom and female vaginal methods (diaphragm, foam, other spermicides). Other methods are counted as traditional.
c/ Based on all women 15-50.
d/ Douche included with foam, etc.
e/ Based on ages 20-49.
f/ Included with "other".

injectables, intrauterine device (IUD), condom, or other effective female methods (diaphragm, foam, other spermicides) -- was almost as large as the percentage that had heard of any method.

Simple recognition of a method does not, of course, imply that the method can be used effectively. The more effective methods require regular supplies or expert medical attention and many methods, including some of the less effective ones, require detailed instructions for proper use.

Knowledge of specific methods

Overall, the most widely-recognized methods are the pill, the IUD, and female sterilization (table 2.17). In all but one country (Nepal), at least one-half of the ever-married women interviewed knew about the pill, and at least three-fourths of them recognized this method in 14 of the 20 countries. Three-fourths of the women recognized the IUD in 12 countries and three-fourths knew about female sterilization in 10 countries. Male sterilization is less widely known (at least by women) than is female sterilization, except in Korea and Nepal. The other major male method - condom - is, with a few exceptions, less widely known than the major female methods. It is possible that there is a greater awareness of male methods among men, who were not interviewed, than among women. 44/

In all countries, the traditional methods(rhythm, withdrawal, abstinence, douche, and other methods not listed by name in table 2.17)were relatively less widely recognized than the modern methods, probably a reflection of the influence of family planning programmes, which emphasize the modern methods. Rhythm and withdrawal were the most widely known of the traditional methods, but in only one country (Costa Rica) did as many as three-fourths of the women recognize either of these methods.

It should be noted that, with a few exceptions, all the figures in table 2.17 represent level of knowledge after the interviewer described each method with a probe question, thereby possibly influencing greatly the apparent level of knowledge of all the specific methods, but especially of the traditional methods. 45/ To the extent that these probe questions influenced the answers, some international incomparability was introduced.

44/ This was true in Thailand, where husbands as well as wives were interviewed. Husbands reported a higher level of knowledge of male sterilization and the condom than did wives, while wives more frequently recognized the pill, IUD, and female sterilization. Thailand National Statistical Office and Chulalongkorn University, Institute of Population Studies, The Survey of Fertility in Thailand: Country Report, Vol. II, table 6.2.1.

45/ See, for example, Sri Lanka Department of Census and Statistics, World Fertility Survey, Sri Lanka 1975, First Report, Ministry of Plan Implementation (1978), table 7.2, p. 127. Knowledge of traditional methods was probably seriously underreported when probes were omitted. The following are countries that omitted certain probes: on injection; Bangladesh, Jordan, Korea, Nepal, Philippines, Panama; douche: Malaysia, Nepal; abstinence: Nepal, Dominican Republic, Panama; rhythm: Nepal. (This information was not available for Kenya.) No probe questions were asked in the Pakistan survey.

It is of interest that, in all countries except Fiji, only a minority of the women reported knowing about abstinence which, along with the relatively small number that knew of withdrawal suggests "... that what is being measured is not simply a technical type of knowledge but rather an orientation to fertility regulation". 46/

The proportion of women who recognized at least one traditional method tends to be higher in countries where knowledge of modern methods is widespread than it is in the other countries (table 2.17). In several, a fairly large fraction of women mentioned that they knew one or more methods in addition to those shown by name in table 2.17, including 55, 28 and 21 per cent, respectively in Jordan, Indonesia and Malaysia. Except in Indonesia, such methods were mentioned spontaneously. 47/ For most of the countries there is no detailed information as to other methods women mentioned. Herbal medicines were mentioned most frequently in Malaysia among the three countries. 48/ It is likely that many of the herbal medicines, if they have any effect on reproduction, act as abortifacients rather than as contraceptives.

Knowledge of a place to obtain contraceptive services and supplies

In the nine countries for which the information is available, relatively fewer women knew of a contraceptive outlet than recognized a contraceptive method (table 2.18). While three-fourths or more of married women had heard of one of the modern methods in 8 of the 9 countries, it is only in three countries (Costa Rica, Republic of Korea and Malaysia) that an equal proportion of the women knew of a place to obtain services.

In serveral countries, the gap in prevalence between knowledge of a modern method and knowledge of a place where one could be obtained was very large. For examples, in Nepal, Pakistan and Kenya, relative numbers of currently married women who knew of at least one modern method were, respectively, 22, 75 and 88 per cent, while only 6, 32 and 42 per cent, respectively, knew of an outlet.

46/ Sri Lanka First Country Report, op. cit., p. 125

47/ In Fiji, in addition to the methods shown in table 2.17, women were asked if they had heard of breast-feeding being practiced for contraceptive reasons; 50 per cent of ever-married women responded that they had. Fiji First Country Report, op. cit., table H1.

48/ Other traditional methods mentioned there include massaging of the uterus, exercise immediately after intercourse, and ceremonies involving incantations and the eating of special foods. Malaysian Fertility and Family Survey - 1974, First Country Report, op. cit., p. 130. In Indonesia, the other methods were primarily herbal medicines, massage of the uterus and "uterus inversion". Indonesia Fertility Survey 1976, Principal Report, op. cit., p. 39.

Table 2.18 **Percentage of currently-married women who had heard of an efficient method of contraception and percentage who knew of a family planning outlet, for selected WFS countries a/**

Country	Percentage	
	Know of a modern method b/	Know of an outlet
Colombia	96	66
Costa Rica c/	100 d/	89 e/
Indonesia	80	53
Kenya	88 f/	42 g/
Republic of Korea	98	86
Malaysia	90 d/	77 e/
Nepal	22 d/	6 e/
Pakistan	75	32
Panama c/	99	72

Notes:

a/ Percentages are taken from WFS First Country Reports or data tapes and are based on currently-married women aged 15-49 or under age 50, except as noted.

b/ Sterilization, pill, injection, IUD, condom, diaphragm, foam and other spermicides.

c/ Ages 20-49.

d/ Based on ever-married women.

e/ G. Rodriguez, "Family Planning Availability and Contraceptive Practice", Family Planning Perspectives, vol. 11, No. 1 (January/February 1979), Table 1, p. 53.

f/ Based on all women aged 15-50.

g/ Based on ever-married women aged 15-50.

Information for three Asian and two Latin American countries suggests that women with little education and those who live in rural areas are usually less likely than others to know of a family planning outlet. 49/ The data, adapted from a recent analysis show that, in all five countries studied, there is a regular and strong increase with education in the likelihood that a woman knows of an outlet, before or after control for the other variables. 50/ In four of the five countries 88-95 per cent of the women with post-secondary education knew of an outlet while the percentage with no education that knew of an outlet ranged from 40 to 80 (table 2.19). In Nepal, there is also a strong differential, but the level of knowledge is relatively low in all educational groups. The intercountry differences in knowledge in rural and urban areas are related to activities of the family planning programmes in these countries. Where the programme is regarded as strong, as in Costa Rica and the Republic of Korea, or where there has been considerable emphasis within the programme on serving rural areas (Malaysia), rural women are nearly as likely as urban women to know of an outlet. In Colombia and Nepal, where programme services have been concentrated in urban areas, urban women are much more likely than rural women to know of an outlet. 51/

Levels and trends in contraceptive use

Tables 2.20 and 2.21 show the levels of contraceptive use and type of method used at the time of the WFS survey and, where roughly comparable survey information was available, also use over time. Contraceptive use at the time of the WFS survey will be discussed first.

Levels of ever use and current use of contraception

Among the developing countries for which data are available, contraceptive use is on the average, highest in the Latin American countries. Within the Asian and Oceanic countries, from four per cent in Nepal to 69 per cent in Fiji of currently-married women in the reproductive ages had used contraception at some time (table 2.20). Within the Latin American countries the range is smaller, from 47 per cent in Mexico to 84 per cent in Costa Rica. The percentage using contraception at the time of the interview ranged from 2 in Nepal to 41 in Fiji among the Asian and Oceanic countries and from 30 in Mexico to 64 in Costa Rica among the Latin American countries. Preliminary data are available for one African country -- Kenya. Although approximately one-third of ever-married Kenyan women aged 15-50 had used contraception at some time, only 7 per cent of the currently married women were using at the time of the interview.

49/ G. Rodriquez, "Family planning availability and contraceptive practice", Family Planning Perspectives, 11:1 (Jan/Feb. 1979), pp. 51-71.

50/ In the case of the education differentials, effects of rural-urban residence are also controlled. These adjusted figures can be interpreted in the same way as one would interpret figures that had been directly standardized on the overall within-country distribution of the control variables.

51/ J. Stoeckel, "Differentials in fertility, family planning practice, and family size values in South Korea, 1965-1971", Studies in Family Planning, vol. 6, No. 11 (November 1975), p. 378; R. Freedman and B. Berelson, "The record of family planning programs", Studies in Family Planning, 7:1 (January 1976), pp. 22, 26; United Nations Fund for Population Activities, Malaysia, Report of Mission on Needs Assessment for Population Assistance, Report No. 10 (1979); United Nations Fund for Population Activities, Nepal, Report of Mission on Needs Assessment for Population Assistance, Report No. 21 (October 1979). In some countries, including Nepal, some services are provided by mobile workers or teams, so that there may be no fixed outlet in many areas that receive some services.

Table 2.19 **Percentage of currently married women who knew a family planning outlet, by education and type of place of residence, selected countries**

Country	Percentage who know of an outlet							
	Level of education					Type of place of residence		
						Urban		Rural
	Total	None	Primary	Secondary	Higher	City	Town	
Colombia								
Unadjusted percentage	66	36	66	90	93	79		43
Adjusted a/	66	42	66	83	87	80		42
Costa Rica								
Unadjusted percentage	89	68	88	93	95	92		85
Adjusted a/	89	71	89	92	94	93		85
Korea								
Unadjusted percentage	86	76	87	91	88	87	83	85
Adjusted a/	86	77	86	93	91	87	83	85
Malaysia								
Unadjusted percentage	77	62	84	90	90	80	83	75
Adjusted a/	77	66	81	89	91	80	82	75
Nepal								
Unadjusted percentage	6	4	30	48	...	38		5
Adjusted a/	6	5	29	38	...	37		5

Sources: Unadjusted data were taken from G. Rodriguez, "Family planning availability and contraceptive practice", Family Planning Perspectives, Vol. 11, No. 1, (January/February 1979), tables 2 and 2A, p. 54.

a/ Education percentages adjusted using analysis of covariance, for years since first marriage, number of living children, and type of place of residence. Type of place percentages adjusted for years since first marriage and number of living children. Based upon unadjusted data in G. Rodriguez, Ibid.

Among the Asian countries there are three -- Nepal, Pakistan and Bangladesh -- in which 15 per cent or fewer of the married women had ever used contraception and fewer than 10 per cent were currently using. These countries are clearly separated, in their level of use, from the other Asian countries; in Indonesia, the country in table 2.20 with the next lowest level of use, about one-fourth of the married women were currently using. The level of use in two of the Latin American countries, Costa Rica and Panama, is within or near the range observed among the developed countries.

Available data for developed countries affiliated with the WFS are also shown in table 2.20. It should be mentioned that, because there was no attempt to utilize a common or very similar questionnaire or to have conformity in regard to the age and marital status categories of women interviewed, the data on contraceptive use vary among the developed countries much more than among the developing countries,52/ and limit further the precision of comparisons among the developed countries or between developed and developing countries. 53/

Generally, in the developed countries represented in table 2.20 with the exception of Romania approximately two-thirds to three-fourths of sexually active or married women in the reproductive ages were using contraception. The level at the time of the surveys range from 57 per cent in Romania to 79 per cent in France. 54/ It is reported that contraceptive use is somewhat less prevalent among married Spanish women, with only 47 per cent said to be using a method on 1977. 55/ Among the developed countries represented in table 2.20, when pregnant and involuntarily infecund women are excluded (table 2.20), around 75-90 per cent of such "exposed" women are seen to have been using contraception (in Romania 65 per cent).

The women who were not using contraception included, along with the pregnant and those who believed themselves infecund, women who wished to have another child soon. In France, Hungary, Norway and the United States of America, 3, 12, 7 and 9 per cent, respectively, of "exposed" women (3-11 per cent of married women) were not using a method even though they were not trying to become pregnant and they believed themselves fecund. 56/

52/ See notes to table 2.20.

53/ Incomparabilities due solely to differences in sample composition can be reduced by producing special tabulations and applying techniques of standardization. For many of the developed countries the requisite data are not available at the time of this writing. However, the Economic Commission for Europe is undertaking a comparative analysis of the surveys for developed countries.

54/ For more precise definitions of the base populations for these figures, see notes to table 2.20.

55/ Henri Leridon, "Les facteurs de la fécondité dans les pays developpés", paper presented to the World Fertility Survey Conference, London 7-11 July 1980, p. 25.

56/ H. Leridon, "Contraceptive practice in France in 1978", International Family Planning Perspectives, vol. 5, No. 1, (March 1979), table 2. , p. 26; Hungary, Main Results of the 1977 Hungarian Fertility, Family Planning and Birth Control Study, TCS-77, (Budapest, Federal Statistical Office, 1979), tables 16.1 and 16.2, pp. 96-97; T. Noaet and L. Østby, "Some results from the Norwegian fertility survey 1977", The Fifth Scandanavian Demographic Symposium, op. cit., table 4, p. 222; and K. Ford, "Contraceptive use in the United States, 1973-1976", Family Planning Perspectives, vol. 10, No. 5, (September/October 1978), table 1, p. 265.

Table 2.20 Levels of and trends in knowledge, ever use and current use of contraception for selected WFS countries

Country	Year of survey	Currently married women [a]				Exposed women [a]	
			Percentage				
		Number	Know a method	Used a method	Currently using	Number	Per cent using
Developing Countries							
AFRICA							
Kenya	1977(WFS)	...	88[b]	32[c]	7	4217	9
ASIA AND OCEANIA							
Bangladesh	1976(WFS)	5762	83	15	8	4645	10
Fiji	1974(WFS)	4658[d]	100[c]	69	40	3314	56[e]
Indonesia	1973[f] [g]	...	56	12	10	...	...
	1976(WFS)	7880	80	38	26	5638	37
Jordan	1972[h]	4938	94[c]	49[c]	22	...	...
	1976 (WFS)	3458	97	46	25	2337	37
Korea, Republic of	1971[f]	4949	...	...	25	...	...
	1974(WFS)	5062	98	59	35	3866	46
	1978 [j] [i]	...	...	...	49		...
Malaysia	1966/67[f]	...	...	...	9	...	...
	1974(WFS)	5811[d]	92[c]	50	33	4487	42
Nepal	1976	5502[d]	22 [c]	4	2	4325	3

Table 2.2 (continued)

Country		Year of survey	Currently married women [a]				Exposed women [a]	
			Number	Percentage			Number	Per cent using
				Know a method	Used a method	Currently using		
Developing Countries								
ASIA AND OCEANIA (cont'd)								
Pakistan		1968[k]	2910	97	12	6	...	...
		1975 (WFS)	4667	75	10	5	3334	7
Philippines		1968[f] [l]	...	63	19	16	...	...
		1978(WFS)	8866[d]	94[c]	58	36	6684	48
Sri Lanka		1975(WFS)	6159	92	45	32	4709	41
Thailand		1969/70 [f] [li]	...	...	...	15	...	...
		1975(WFS)	3517	97	48	33	2569	45
LATIN AMERICA								
Colombia	urban	1969[m]	...	65[n]	...	45	...	...
	rural	1969[m]	...	36[n]	...	15	...	...
	urban	1976(WFS)	...			54		
	rural	1976(WFS)	...			32		
	total	1976(WFS)	2827	96	62	43	2323	52
		1978[m]	2086	94[n]	62	46	1871	52
Costa Rica		1976(WFS) [o]	2699[d]	100[c]	84	64	2222	78
		1978 [p]	2037[d]	...	83	64	1708	76
Dominican Republic		1975(WFS)	1842[d]	97[c]	49	31	1378	41
Guyana		1975(WFS)	3216	96	55	32	2735	38
Jamaica		1975/76(WFS)	2302 [d]	98 [c]	66	38	1939	45
Mexico		1977(WFS)	5659 [d]	90	47	30	4107	42
		1978 [g]	2855	94	65	40	1975	56

Table 2.20 (continued)

Country	Year of survey	Currently married women[a] Number	Percentage Know a method	Percentage Used a method	Percentage Currently using	Exposed women[a] Number	Exposed women[a] Per cent using
Developing Countries							
ASIA AND OCEANIA (cont'd)							
Panama	1974 [f]	...	...	...	31 [f]	...	...
	1976(WFS) [o]	2723	99	75	54	2257	65
Peru	1977(WFS)	5060	82	50	31	3853	41
Developed Countries							
Czechoslovakia	1970 [s] [t]	2548	91	...	66	...	...
	1977(WFS) [u]	3041	96	...	...	...	88 [v]
Denmark	1970 [s] [t][w]	2397	99	88	67[x]	...	84[y]
	1975(WFS)[z]	...	...	...	...	3292	76[y]
France	1972 [s] [t][aa]	2434	100	73	64	...	71
	1978(WFS)[bb][cc]	...	...	...	79	...	88
Hungary[s][dd]	1966[ee]	6094	...	...	67	5591	73
	1977(WFS)[ee]	4011	...	...	73	3626	81
Japan[ff]	1950[gg]	5579	...	...	20	...	...
	1965[gg]	3140	...	...	56	...	...
	1974[hh](WFS)	2519	100	78	67	...	...
Netherlands	1969[s][t][ii]	...	...	...	59	...	...
	1975(WFS)[jj][kk]	4364	...	89	73	3900	82
Norway	1977(WFS)[ll]	3941[mm]	...	90[mm]	...	...	84[s][nn]
Romania	1978(WFS)[oo][pp]	10,141	86	...	57	8554	65[qq]
United Kingdom (Great Britain)	1967/68 [s][rr]	1631	...	88	67	...	...
	1976 [ss] (WFS)	4718 [tt]	...	...	72	...	81
United States [uu]	1973[f]	7566	...	...	70	...	82
	1976(WFS)[f]	6414	...	...	68	...	83

Table 2.20 (continued)

Notes and Sources:

Unless otherwise stated, data are from World Fertility Survey First Country Reports and/or tapes.

a/ For currently married women, percentages have been calculated based on women currently married or in a union, aged 15-49 unless otherwise specified. For exposed women percentages have been calculated based on women aged under 50, married or in a union, excluding those who are currently pregnant or infecund (but including those sterilized for contraceptive purposes), unless otherwise specified.

b/ Percentage has been calculated on the basis of all women aged 15-50.

c/ Percentage has been calculated on the basis of ever-married women.

d/ Includes currently pregnant women who are not currently married, if any.

e/ Excludes women practicing post-partum abstinence.

f/ For age group 15-44.

g/ J. Sinquefield and B. Sungkono, "Fertility and family planning trends in Java and Bali", International Family Planning Perspectives, vol. 15, No. 2, (June 1979), table 9, pp. 49-51.

h/ Jordan, Department of Statistics, National Fertility Survey in Jordan 1972, (Amman, 1976), Tables 33, 51 and 58, pp. 80, 114, 128.

i/ For age group 20-44.

j/ D. Nortman and E. Hofstatter, Population and Family Planning Programs: A factbook, (New York, The Population Council, 1980), Tenth Edition, Table 21.

k/ N.M. Shah, "Past and current contraceptive practice in Pakistan", Studies in Family Planning, vol 10, No. 5 (May 1979), Tables 1 and 2, p. 166.

Table 2.20 (continued)

Notes and Sources: (cont'd)

l/ M.B. Concepción and P.C. Smith, The Demographic Situation in the Philippines: an assessment in 1977, East-West Population Institute Papers, No. 44 (Honolulu, Hawaii, East-West Center, 1977), table 9, p. 34.

li/ N. Debavalya and J. Knodel, Fertility Transition in Thailand: A Comparative Analysis of Survey Data, (Bangkok, Chulalongkorn University and Thailand National Statistical Office, 1978), Table 8, p. 13.

m/ Encuesta Nacional de Prevalencia del Uso de Anticoncepción, Colombia, 1978 (Bogota, Corporación Regional de Población, 1979), tables 5.5, 6.6, 6.13, pp. 52, 60 and 65.

n/ Percentages have been calculated on the basis of all women aged 15-49.

o/ For age group 20-49.

p/ Costa Rica, Dirección General de Estadistica y Censos, Informe de la Encuesta Nacional de Uso de Anticonceptivos, Costa Rica, 1978, (San Jose, 1978), tables 7.2, and 7.3, pp. 50-51.

q/ Encuesta Nacional de Prevalencia en el use de Methods Anticonceptivos, Informe de Resultados, Mexico, (Mexico D.F., Coordinacion del programa Nacional de Planificacion Familiar, 1979), tables 5.1 and 5.4, pp. 99 and 103. R. Rodríguez-Barocio et. al., "Fertility and Family Planning in Mexico", International Family Planning Perspectives, vol. 6, No. 1, (March 1980), table 5, p.6.

r/ R.W. Rochat, et. al., "Using contraceptive prevalence surveys to study the demographic impact of contraceptive sterilization in Latin America", paper presented at the IUSSP Workshop on Methodological Aspects of Contraceptive Sterilization, (Atlanta, Georgia, Center for Disease Control, 1979).

s/ Contraceptive use figures exclude sterilization.

t/ Fertility and Family Planning in Europe Around 1970: A Comparative Study of Twelve National Surveys (United Nations publication, Sales No. E.76.XIII.2), pp. 7, 11, 21 and 151, tables 1, 4, 8 and 124.

u/ Czechoslovakia, Federální Statistizky Úrad, Setrení Plodnosti, (Prague, 1979), tables 16 and 35, pp. XIV and 16. For women aged 18-44, in first marriage.

v/ Per cent of fecund non-pregnant women who normally use a method.

w/ Excluding central municipalities of Copenhagen.

x/ Used a method during the last two months.

y/ Used a method during the last two months, based on currently married or cohabiting women who could have become pregnant during that period.

Table 2.20 (continued)

Notes and Sources: (cont'd)

z/ Gert Schmidt, "Use of contraceptives in 1975 among Danish women 18-49 years", The Fifth Scandinavian Demographic Symposium, (Oslo, The Scandinavian Demographic Society, 1979), Table 3, p. 248.

aa/ Percentages have been calculated on the basis of ever-married women aged less than 45.

bb/ H. Leridon, "Contraceptive practice in France in 1978", International Family Planning Perspectives, vol. 5, No. 1, (March 1979), Table 1, p. 26.

cc/ Percentages have been calculated on the basis of currently married and sexually active unmarried women aged 20-44.

of

dd/ Percentages have been calculated on the basis/currently-married women aged 15-39.

ee/ Hungary, Main Results of the 1977 Hungarian Fertility, Family Planning and Birth Control Study, TCS-77, (Budapest, Federal Statistical Office, 1979), Tables 16.1 and 16.2, pp. 96-99.

ff/ The 1950 and 1965 figures are taken from a long series of surveys conducted by the Mainichi newspaper. The 1975 survey in this series shows a level of use somewhat lower than the 1974 WFS (61 per cent vs. 67 per cent); this is probably the result of differing methods of posing the questions.

gg/ Y. Okazaki, "Knowledge, attitudes and practice of family planning", Fertility and Family Planning in Japan, (Tokyo, Japanese Organization for International Cooperation on Family Planning, Inc., 1977), Table 1, p. 120.

hh/ The 1974 Japan National Fertility Survey: A Summary of Findings, World Fertility Survey Summary Reports, No. 14, (Voorburg, Netherlands, International Statistical Institute, 1979), table 10, pp. 2 and 8.

ii/ Percentages have been calculated on the basis of women in marriage cohorts of 1958 and 1963, aged less than 45 at marriage, in first marriage.

jj/ Percentages calculated on the basis of women from marriage cohorts of 1963-1973 in first marriage.

kk/ H.G. Moors, et. al., Nationaal Onderzoek Vruchtbaarheid en Ouderschapsmotivatie, Erste Resultaten, (National Survey on Fertility and Parenthood Motivation, First Results), (Voorburg, Netherlands, Nederlands Interuniversitair Demografisch Instituut, 1976), Tables 2.2A and 2.51.

Table 2.20 (continued)

Notes and Sources: (cont'd)

ll/ T. Noack and L. Østby, "Some results from the Norwegian fertility survey 1977", The Fifth Scandinavain Demographic Symposium, op. cit., Table 4, p. 222.

mm/ Percentages have been calculated on the basis of women aged 18-44 who ever had intercourse.

nn/ Per cent who used contraception at least once in the last four weeks, based on fecund non-pregnant women who had intercourse at least once in the last four weeks.

oo/ Percentages have been calculated on the basis of women in first marriage.

pp/ Data supplied by the Romanian Government.

qq/ Including women who are uncertain whether they are fecund or not.

rr/ C.M. Langford, Birth Control Practice and Marital Fertility in Great Britain, (London, London School of Economics, 1976), pp. 7 and 32, table 4.4. Based on women married between 1941 and 1965, in first marriage, aged less than 35 at marriage.

ss/ "Widespread contraceptive use found in Britain; condom popular; two-child families preferred", Family Planning Perspectives, vol. 12, No. 2, (March/April 1980), table 1, p. 109.

tt/ For age group 16-49.

uu/ K. Ford, "Contraceptive use in the United States, 1973-1976", Family Planning Perspectives, vol. 10, No. 5, (September/October 1978), table 1, p. 265.

In the developed countries (Japan and the Netherlands) and developing countries (except Kenya) for which data are **available** most ever users were currently using at the time of the survey. 57/ Among the developing countries shown in table 2.20 (excepting Kenya), the percentage of currently married women who ever used contraception correlates almost perfectly with the percentage currently using (r = .94). Thus, since the time reference of current use is clearer than that of ever use, and also since current use may be somewhat more accurately measured than ever use, the remainder of this discussion focuses on current use.

Trends in contraceptive use

For several of the developing countries and for most of the developed countries **participating** in the WFS, surveys conducted before or after the WFS survey permit an examination of trends in the level of contraceptive use (table 2.20 and 2.21). 58/ These figures show a rapid increase in the level of use between the late 1960's and the mid 1970's in Thailand, Malaysia, the Republic of Korea, the Philippines and Colombia. The percentage of currently married women who were using contraception more than doubled (starting from initially low levels) in a period of less than 10 years in Malaysia, the Philippines and Thailand and approximately doubled in Korea between 1971 and 1978. Surveys taken in Mexico in 1977 and 1978 showed in that country, that contraceptive use had increased markedly, from 30 to 40.

By contrast, surveys in Jordan, Pakistan and Costa Rica reveal little if any change in the level of use. The Costa Rica surveys were conducted only 2 years apart, and the level of use was already quite high at the earlier survey. In Pakistan, however, the methodology of the two surveys differed in a way that probably led to an understatement of use at the later date. 59/ There may have been modest increase in contraceptive use in Pakistan, but there is no reason to suppose that the increase has been as dramatic as that recorded in some other Asian countries. The reported level of contraceptive use in Jordan increased only slightly between 1972 and 1976.

57/ This comparison is made for results from WFS surveys only.

58/ This comparison is restricted to countries for which WFS information is available. Figures shown in table 2.20 and table 2.21 are taken from surveys that were judged roughly comparable to the WFS survey. Cf. D. Nortman and E. Hofstatter, Population and Family Planning Programs: A Fact Book, Tenth Edition, The Population Council, (New York, 1980, forthcoming), table 21 for estimates derived from survey and other sources. Differences between successive surveys in question wording, in training of interviewers and in other interviewing conditions may have affected the estimates of changes over time in the level of use of contraception and in the types of methods used. In particular, the level of use of traditional methods appears much lower if these methods are mentioned spontaneously by the interviewer than if "probe" questions were introduced. Differences in question wording were judged not to affect the general impression of time trends that this table conveys, but the figures should be treated with caution.

59/ N.M. Shah, "Past and current contraceptive practice in Pakistan", **Studies in Family Planning**, 10:5 (May 1979), pp. 164-173.

Table 2.21 Percentage of current contraceptive users, by method used, for selected WFS countries

Country	Year	Total users[a]	Modern[b]	Sterilization		Pill	Injection	IUD	Condom	Diaphram, foam, etc.[c]	Rhythm	Withdrawal	Abstinence	Douche	Other
				Female	Male										
Asia and Oceania															
Bangladesh (WFS)	1976	100	61	4	6	35	0	6	9	0	13	7	15	1	3
Fiji (WFS)	1974	100[d]	86	39		20	...	11	15	...[e]	6	6	3		
Indonesia (WFS)	1976	100	87	1	0	56	1	21	7	0	3	1	4	0	5
Jordan	1972[f]	100[g]	...	4		63	...	4	5	8	10	14	3	5	...
(WFS)	1976	100	69	7	0	47	...	8	6	1	8	13	1	0	8
Korea, Republic of	1971[h]	100[i]	...	12		30	0	28	14	17					
(WFS)	1974	100	77	5	9	24	1	23	15	1	13	7	1	1	0
	1978[j]	100[k]	...	22	11	13		20	34						
Malaysia	1966/67	100[l/m]	...	...	...	46		2	9	2	40				
(WFS)	1974	100	72	10	1	49		2	9	1	11	6	5	6	
Nepal (WFS)	1976	100	98	3	65	17	0	3	9	0	0	0	2	0	0
Pakistan (WFS)	1975	100	72	18	1	18	0	12	19	3	2	2	22	0	2
Philippines	1968[n]	100	17	1		9	0	3	3	1	32	47	...	2	2
(WFS)	1978	100	45	13	2	13	0	6	10	0	24	26	5	0	0
Sri Lanka (WFS)	1975	100	59	31		5	1	15	7	0	25	5	11	0	0
Thailand (WFS)	1975	100	92	19	6	41	6	18	1	0	3	3	2	0	1

Table 2.21 (continued)

Country	Year	Total users[a]	Modern[b]	Sterilization		Pill	Injection	IUD	Condom	Diaphram, foam, etc.[c]	Rhythm	Withdrawal	Abstinence	Douche	Other
				Female	Male										
Latin America															
Colombia															
Urban	1969 [o]	100	51	4	0	22	0	11	7	7	16	24	...	— 9 —	
Rural	1969 [o]	100	40	7	0	13	0	7	7	7	20	33	...	— 7 —	
(WFS)	1976	100	72	9	0	31	1	20	4	5	12	11	2	1	2
	1978 [o]	100	81	16	0	37	...[p]	17	3	8	9	...[e]	...	— 10 —	
Costa Rica (WFS)	1976	100	83	19	2	35	3	8	14	3	8	7	1	0	0
	1978 [q]	100	86	22	1	37	3	7	14	2	8	6	...	— 1 —	
Dominican Republic (WFS)	1975	100	84	38	0	— 26 —		9	5	7	4	11	...	...	1
Guyana (WFS)	1975	100	90	27	0	29	1	18	9	6	3	4	2	0	1
Jamaica (WFS)	1975-1976	100	94	21	0	31	16	5	17	4	1	4	1	0	0
Mexico (WFS)	1977	100	77	9	1	36	6	19	2	5	10	12	...	1	0
	1978 [r]	100[s]	83	18	0	35	7	16	3	4	7	7	...	— 3 —	
Panama (WFS)	1976	100[t]	85	39	1	32	1	7	2	3	5	6	3	1	1
Peru (WFS)	1977	100	36	9	0	13	3	4	3	3	35	10	7	11	2

Table 2.21 (continued)

Country	Year	Total users a/	Modern b/	Sterilization Female	Sterilization Male	Pill	Injection	IUD	Condom	Diaphram, foam, etc. c/	Rhythm	Withdrawal	Abstinence	Douche	Other
Developed Countries															
Czechoslovakia u/	1970 v/	100 l/	35	...	...	4	—	14	19	...	3	52	...	— 8 —	
(WFS)	1977 w/	100 g/l/	...	...	...	17	—	25	20	1	12	52	2	...	...
Denmark x/	1970 v/	100y/l/	80	...	...	37	—	4	30	9	2	7	...	—11 —	
(WFS)	1975 z/	100aa/l/	93	...	...	39	—	13	33	7	——— 7 ———				
France	1972 v/	100bb/l/	32	...	...	17	—	2	12	1	14	52	...	— 2 —	
(WFS)	1978 cc/	100dd/	64	— 6 —		39	—	12	7	...e/	8	25	...	— 3 —	
Hungaryee/ff/	1966	100l/	27	...	...	0	—	0	17	10	4	63	...	5	1
(WFS)	1977	100l/	71	...	...	49	—	13	6	2	4	23	...	1	1
Japan	1950gg/	100g/	...	—	—	0	—	0	36	...hh/	27	13	— 9 —		
	1965gg/	100g/	...	— 6 —		0	—	4	65	...ii/	39	10	— 2 —		
(WFS)	1974jj/	100l/	86	...	...	2	—	7	75	2	7	4	0	— 3 —	
Netherlands	1969 v/	100kk/l/	71	...	...	45	—	1	23	2	19	9	...	— 1 —	
(WFS)	1975ll/	100mm/	92	3	3	66	—	6	14	1	4	3	...	— 1 —	
Norway (WFS)	1977nn/	100oo/l/ g/	...	...	...	23	—	39	25	2	7	11	...	...	...
Romania (WFS)	1978pp/	100qq/l/	9	...	...	1	—	0	6	2	41rr/	43	. .	7	0
United Kingdom	1967/68ss/tt/	100g/	...	...	...	16	—	2	47	18uu/	6	31	...	— 2 —	
(Great Britain) (WFS)	1976 vv/	100g/	...	10	10	33	—	8	26	2	...	9	...	— 3 —	
United Statesm/ ww/	1973	100	91	12	11	36	—	10	14	8	4	2	...	1	2
(WFS)	1976	100	89	14	14	33	—	9	11	9	5	3	...	1	1

Table 2.21 (continued)

Notes:

Unless otherwise stated, data are taken from World Fertility Survey (WFS) Country Reports and magnetic data tapes. **Where results of one or more surveys is given, the World Fertility Survey is so designated.**

a/ Percentages have been calculated on the basis of currently married current users aged 15-49 or under 50, unless otherwise specified. Percentages may not add to 100 because of rounding.

b/ Sterilization, pill, injection, IUD, condom, diaphragm and foam and other spermicides.

c/ Includes other spermicides, such as jelly, suppositories.

d/ Excluding women practicing post-partum abstinence.

e/ Included with "other"category.

f/ Jordan, Department of Statistics, National Fertility Survey in Jordan 1972 (Amman, 1976), Tables 56, 58, pp. 123, 128.

g/ Figures do not add to 100 because women using a combination of methods are shown under each method.

h/ Factors Affecting the Use and Non-use of Contraception: Findings from a Comparative Analysis of Selected KAP Surveys, United Nations publication, Sales No. E.79.X111.6, Table 6, p. 52.

i/ Percentages **were** calculated on the basis of users aged 20-39.

j/ D. Nortman and E. Hofstatter, Population and Family Planning Programs: A Fact Book (New York, The Population Council, 1980), tenth edition, Table 21.

k/ Percentages **were** calculated on the basis of users aged 20-44.

l/ Excluding sterilization.

m/ Percentages **were** calculated on the basis of users aged 15-44.

n/ Data were supplied by the government of the Philippines.

o/ Encuesta Nacional de Prevalencia de Uso de Anticoncepcíon, Colombia, 1978, Corporacíon Regional de Poblacíon (Bogota, 1979), Table 6.13, p. 65.

p/ Included with diaphragm, etc.

Table 2.21 (continued)

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q/ Costa Rica, Direccíon General de Estadística y Censos, Informe de la Encuesta Nacional de Uso de Anti-conceptivos, Costa Rica, 1978 (San José,1978), Table 7.6, p. 55.

r/ Encuesta Nacional de Prevalencia en el Uso de Metodos Anticonceptivos, Informe de Resultados, Mexico, (Coordinacíon del Programa de Planificacíon Familiar, México, D.F., 1979), Table 5.3, p. 102.

s/ **Percentages were** calculated on the basis of current users among all women aged 15-49.

t/ **Percentages were** calculated on the basis of users aged 20-49.

u/ Method "normally" used.

v/ Fertility and Family Planning in Europe Around 1970: A Comparative Study of Twelve National Surveys, United Nations Publication, Sales No. E.76.XIII.2, table 124, p. 151.

w/ Percentages were **calculated on the basis of users aged 18-44, in first marriage.**

x/ Method used in the last 2 months.

y/ Excluding Central Municipalities of Copenhagen.

z/ Gert Schmidt, "Use of Contraceptives in 1975 Among Danish Women 18-49 Years", The Fifth Scandinavian Demographic Symposium (Oslo, The Scandinavian Demographic Society, 1979), Table 3, p. 248.

aa/ **Percentages were** calculated on the basis of users among all women aged 18-49.

bb/ **Percentages were** calculated on the basis of users among ever-married women aged less than 45.

cc/ H. Leridon "Contraceptive Practice in France in 1978", International Family Planning Perspectives, vol. 5, No. 1 (March 1979), Table 1, p. 25.

dd/ **Percentages were** calculated on the basis of current users among all women aged 20-44.

ee/ Ages 15-39

ff/ Hungary, Federal Statistical Office, Main Results of the 1977 Hungarian Fertility, Family Planning and Birth Control Study, TCS-77 (Budapest, 1979), Tables 16.1 and 16.2, pp. 96-97.

Table 2.21 (continued)

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gg/ Y. Okazaki "Knowledge, Attitudes and Practice of Family Planning" Fertility and Family Planning in Japan (Tokyo, Japanese Organization for International Cooperation on Family Planning, Inc., 1977), Table 12, p. 135.

hh/ In all, 14 per cent using foam, 15 per cent using jelly, 8 per cent diaphram. It is not known whether these methods are being used in combination.

ii/ In all, 6 per cent using foam, 9 per cent jelly, 6 per cent diaphram. It is not known whether these methods are being used in combination.

jj/ Data supplied by the Japanese Government. Women using more than one method were counted as users of the more efficient method. In all, 27 per cent of users were using rhythm and 15 per cent withdrawal, but many of these were also using another method.

kk/ Percentages calculated on the basis of users from marriage cohorts of 1958 and 1963, in first marriage.

ll/ H. G. Moors et. al., **Nationaal Onderzoek** Vruchtbaarheid en **Ouderschapsmotivatie**, Erste Resultaten (National Survey on Fertility and Parenthood Motivation, First Results), (Voorburg, Netherlands, Nederlands Interuniversitair Demografisch **Instituut**, 1976), Table 2.5.1.

mm/ Percentages calculated on the basis of users from marriage cohorts of 1963-1973 in first marriage.

nn/ T. Noack and L. Østby , "Some Results from the Norwegian Fertility Survey of 1977", The Fifth Scandinavian Demographic Symposium, op. cit., Table 4, p. 222

oo/ Percentages have been calculated on the basis of women aged 18-44 who used at least once in the last four weeks.

pp/ Data supplied by the Romanian government.

qq/ Percentages have been calculated on the basis of **users** in first marriage.

rr/ Includes those using withdrawal or douche plus rhythm.

ss/ C.M. Langford, Birth Control Practice and Marital Fertility in Great Britain (London, London School of Economics, 1976), pp. 7 and 33, table 4.5.

tt/ Users in first marriage, married between 1941 and 1965, aged under 35 at marriage.

uu/ Number shown is the sum of the percentage using a spermicide and the percentage using the diaphragm; same women may be using these methods in combination.

vv/ "Widespread contraceptive use found in Britain", Family Planning Perspectives, vol. 12, No. 2 (March/April 1980), p. 109, table 2.

ww/ K. Ford "Contraceptive use in the United States, 1973-1976" Family Planning Perspectives, vol. 10, No. 5 (September/October 1978), table 1, p. 265.

In most of the developed countries represented in table 2.18, some increase in the level of contraceptive use occurred during the 1970's. In Japan, for which results of a 1950 survey are also shown, there was a dramatic and sustained increase in use over time until, in the mid-1970's, the level of use was close to that found in the United States of America and in many European countries. In most developed countries, however, level of use, already quite high in the late 1960's or early 1970's, is approaching or may have reached a ceiling. As mentioned earlier, for those countries in which at least two-thirds of the married women in the reproductive ages were currently using, most women who were not using contraception believed themselves to be infecund, were currently pregnant or wished to become pregnant; in such cases, roughly 10 per cent or fewer of the married women were not using and exposed to the risk of an unwanted or mistimed pregnancy. The level of use in Denmark declined slightly between 1970 and 1975; the decline was confined to young married women. 60/

Specific contraceptive methods used, and trends in method used

In all the developing countries shown in table 2.20 and figure 2.1, with the exception of the Philippines and Peru, a majority of the women who are using contraception are using one of the modern methods: Male or female sterilization, pill, injectable, IUD, condom or female chemical or barrier methods (diaphragm, foam, other spermicides). 61/

The pill is an important method in most developing countries and, in many, it is the most frequently used. And while one method rarely accounts for as much as one-half of total contraceptive use, over half of all contraceptors in Indonesia use the pill. The only countries in which the pill accounts for less than 20 per cent of use are Nepal, Pakistan, the Philippines, Sri Lanka and Peru.

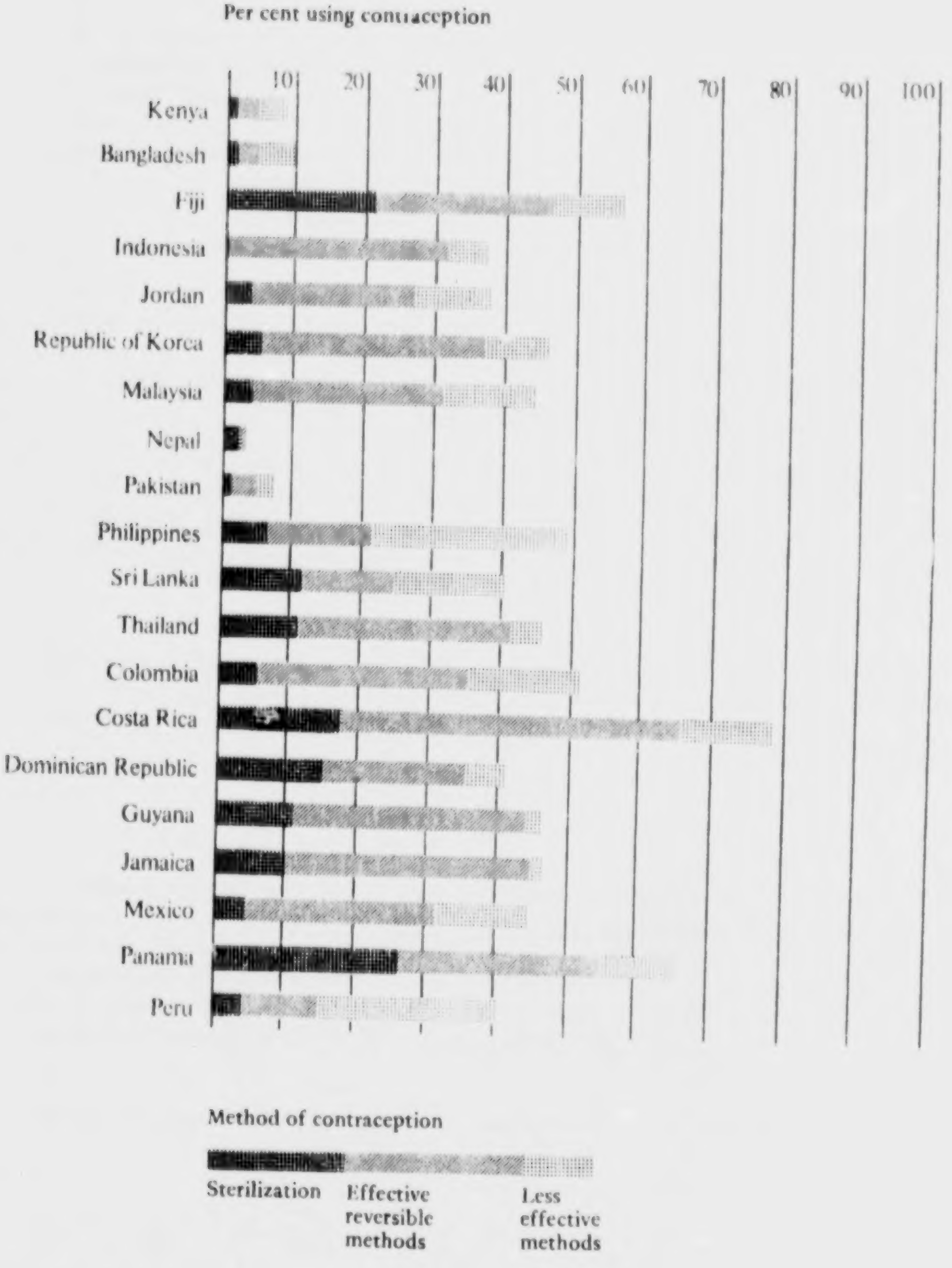
Female sterilization is also a major method in many countries, especially in Panama, where approximately one-fourth of the exposed women had been sterilized, but it accounted for less than 10 per cent of use in Bangladesh, Indonesia, Jordan, Nepal and Peru.

60/ Gert Schmidt, "Use of contraceptives in 1975 among Danish women 18-49 years", The Fifth Scandanavian Demographic Symposium (Oslo, The Scandanavian Demographic Society, 1979), table 3, p. 248. Use may have increased again in the last few years. Sales of oral contraceptives, which had declined following liberalization of the abortion law, have recently increased, though not to the earlier level. C. Tietze, Induced Abortion: 1979, (New York, The Population Council, 1970), Third Edition, p. 88.

61/ See the section above on "Knowledge of contraception in developing countries".

Figure 2.1
Percentage of exposed women currently using contraception by type of method

20 World Fertility Survey Countries



Both the pill and female sterilization have tended over time to increase in share of total contraceptive use in most developing countries for which such information is available. In the Republic of Korea, however, pill use has declined, relative to use of other methods, while female sterilization has increased greatly, following an extension of programme subsidies to cover that method.

The IUD and condom are important methods in many countries but generally attract fewer users than do the pill and female sterilization. These methods have tended not to grow in relative importance over time, except in the Philippines, though actual number of users has, in most cases increased. It is possible that condom usage would appear somewhat higher if men rather than women had been interviewed.

Male sterilization is infrequently practiced in all of the Latin American and most of the Asian countries. In Korea, roughly five per cent of couples were using this method (11 per cent of users in 1978), and while it accounted for most of the use in Nepal, only 2 per cent of married couples were using this method. Injectables and female vaginal methods account for less than 10 per cent of all use, and the diaphragm, foam, and other similar methods appear to have decreased in relative importance over time.

In Bangladesh, Jordan, Malaysia, Pakistan, Sri Lanka and Colombia, between one-half and one-fourth of users were applying (at the most recent survey shown) one of the traditional methods -- rhythm, withdrawal, abstinence, douche, and miscellaneous other methods. Of the latter methods, rhythm and withdrawal are numerically the most important in most countries, and they account for 45-50 per cent of all use in Peru and the Philippines. With the exception of Peru, modern methods are heavily predominant in the Latin American countries.

There is no clear difference between Asian and Latin American countries in the types of methods most frequently in use. There is wide variability among countries within each region; the mix of methods is probably determined by many factors, including relative cost and availability of various methods to potential users, factors greatly influenced by the emphasis of official or other organized family planning programmes, most of which actively promote the use of some combination of methods that are classified here as modern though a few programmes also encourage the use of other methods. 62/

Within most of the developed countries, the change in the particular methods used during the recent past has perhaps been more important than changes in the overall level of use. In several of the countries, particularly France and Hungary among the countries of Europe, there has been a dramatic move away from coitus interruptus toward modern, more effective methods,

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62/ For example, Catholic-supported services in the Philippines promote the use of rhythm. R. Freedman and B. Berelson, "The record of family planning programs", Studies in Family Planning, vol. 7, No. 1, (January 1976), p. 11.

especially the pill, but also the IUD. Relatively effective methods now account for well over half the current use in all the developed countries shown, with the notable exceptions of Romania, in which roughly only 10 per cent of those using are applying a modern method, and Czechoslovakia, in which there is little evidence of a decline in the use of traditional methods. 63/ Even though the use of withdrawal has declined rapidly in several European countries, this method still accounts for more of total contraceptive use in France, Hungary, Czechoslovakia and Romania than in most of the developing countries. It is reported to account also for 22 per cent of use in Spain. 64/ Information about contraceptive sterilization is not available for many of the developed countries. This method has rapidly increased in importance in the United States where, by 1976, it accounted for nearly 30 per cent of all current use and was used by nearly 20 per cent of currently married women aged 15-44. In France, Japan and the Netherlands it accounted for only 6 per cent of current use. However, it should be noted that the Netherlands sample contains only women in the marriage cohorts of 1963-1973, many of whom have probably not yet had the number of children desired.

One conclusion to be drawn from the foregoing discussion is that the contraceptive methods responsible for the fertility decline now occurring in many developing countries are not exclusively those that produced the earlier decline in fertility in the countries of Europe. Indeed, with a few exceptions -- notably the Philippines and Peru, among the countries examined here -- most couples who practice contraception are using modern, relatively effective female methods. A large fraction of women in the developing countries reported that they had never heard of the male methods, while there was in most countries a high level of awareness of one or more of the modern methods, no doubt largely because family planning programmes have emphasized these methods. It is possible that knowledge and use of male methods would have appeared more prevalent had husbands been interviewed. At the same time, traditional methods are of considerable importance, they were practiced by at least 10 per cent of exposed women in 11 of the 19 countries for which information was available. It may be that the wide use of the more traditional methods is due, at least in part, to the side effects that often accompany application of such effective, reversible methods as pills and the IUD, for example, causing women to discontinue their use. 65/

63/ Note that in respect to the 1977 survey Czechoslovakian women who normally used more than one method are shown more than once in the table.

64/ Henri Leridon, "Les facteurs de la fecondité dans les pays developpés", paper presented to the World Fertility Survey Conference, London, 7-11 July 1979. (Plenary Session No. 7), p. 25.

65/ See Population Reports, Series A-D, H,K, various issues (1972-1979), for discussions of side effects of various modern methods covered in this report.

Factors other than contraception affecting fertility

Married or cohabiting women may not be at risk of conception for reasons other than pregnancy, infecundity or contraceptive sterilization (the definition adapted by the WFS for "exposed women"). Where lengthy breastfeeding is the norm, a large fraction of the women may have been in a state of post-partum amenorrhea at the time of the interview and would not have considered themselves at risk.

Direct information about post-partum amenorrhea at the time of the interview is available only for the Philippines and Kenya. In these two countries, over one-fifth and one-third, respectively, of women whose last pregnancy led to a live birth and who were not currently pregnant were still in post-partum amenorrhea at the interview. 66/

While it is reasonable to expect some contraceptive use among women who are in post-partum amenorrhea, it is likely that many women are not practicing, either because they believe themselves to be at no risk or for some other reason (such as concern that use of the pill may be harmful to the nursing baby or a judgement that the risk of pregnancy though not absent, is acceptably low).

The period of breastfeeding, which affects the length of amenorrhea, 67/ varies considerably among countries, being influenced, *inter alia*, by culture and level of infant mortality. When compared with the practice in Asian countries, the reported duration of breastfeeding in the Philippines was not particularly long, indirectly indicating that the level of amenorrhea is at least as high in several other countries as it is in the Philippines. In that country the reported duration of breastfeeding in the last closed interval was 10 months; 22 per cent of women who had a closed interval did

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66/ Philippines First Country Report, *op. cit.*, table 5.2.5; Republic of Kenya , Central Bureau of Statistics, Kenya Fertility Survey, Major Highlights, mimeographed document prepared for the WFS Regional Meeting for Countries South of the Sahara, Nairobi, 3-5 September 1979, p. 77.

67/ It was estimated, on the basis of several studies, that the average of amenorrhea increases with the average duration of breastfeeding roughly as follows:

Months of breastfeeding	Months of amenorrhea
0	2
3	3
6	4-5
9	6
24+	15

H. Leridon, "Biostatistics of Human Reproduction" in C. Chandrasekaran and A. Hermalin, eds., Measuring the Effect of Family Planning Programs on Fertility, (Dolhain, Belgium, IUSSP, 1975), pp. 93-131.

not breastfeed at all, but 65 per cent breastfed for more than 6 months. In Korea and Bangladesh over 90 per cent, 68/ and in Indonesia, Nepal, Thailand and Pakistan 80-85 per cent breastfed more than 6 months. In other countries for which information is available, the percentage varies from roughly 75 in Jordan and Sri Lanka to 30 in Malaysia and Costa Rica.

Factors other than breastfeeding and the associated period of amenorrhea may also be important in some countries. Women may be protected from pregnancy for a long period after a birth by the practice of post-partum abstinence. This practice may not be regarded by the people themselves as a method of preventing conception, although it certainly has the effect of increasing birth intervals. In Fiji, 9 per cent of those counted as "exposed" by the definition given above were practicing post-partum abstinence at the time of the interview; of these only 12 per cent classified the practice as equivalent to contraception. 69/ In most of the countries discussed here, post-partum amenorrhea probably endures for a longer period, on average, than does post-partum abstinence, but data regarding this are unavailable for most countries. In the Philippines, 9 per cent of women whose last pregnancy ended in a live birth and who were not currently pregnant were practicing post-partum abstinence, but most of these women were probably also in amenorrhea. 70/ Four per cent of "exposed" women in Colombia were practicing abstinence and, in Kenya, one per cent of women were protected by post-partum abstinence in addition to those protected by amenorrhea. 71/

Another factor which is important in some countries is the temporary separation of spouses; information about this is also lacking for most countries. In Kenya, for which statistics on this are available, only one per cent of women were not at risk because of the husband's absence in addition to those removed from risk by the other factors discussed above. 72/

The incidence of induced abortion is not discussed in this report, but it should be borne in mind that abortion, legal or illegal, may represent a widely utilized alternative to contraceptive use. Of the developing countries covered here, induced abortion is clearly most important in the Republic of Korea, where it is readily available in medically supervised circumstances. At the time of the survey in 1974, 30 per cent of ever-married women aged 15-49 reported having had at least one induced abortion, and the reported incidence had increased over time; 14 per cent of completed pregnancies reported by ever-married women had been terminated by induced abortion. 73/ These figures have not been corrected for underreporting.

68/ For Bangladesh, excluding women who breastfed until the child died.

69/ Fiji First Country Report, op. cit., table H16.

70/ Philippines First Country Report, op. cit., tables 6.4.3, 6.2.5.

71/ Colombia data are from unpublished tabulations; Kenya, Central Bureau of Statistics, op. cit.. In Kenya another 1 per cent were protected by abstinence.

72/ Kenya Central Bureau of Statistics, op. cit.. Only absences of three or more months duration are counted here.

73/ Republic of Korea, First Country Report, op. cit., pp. 130-137.

Differentials in contraceptive use in developing countries

It seems self-evident that motivation to use contraception is determined to a major extent by the number of children already in the family. It might be expected therefore that the percentage of women currently using contraception would increase as family size increases.

Table 2.22 shows the distribution of exposed women by family size, and table 2.23 and figure 2.2 show the level of current contraceptive use among exposed women by number of living children. In all countries, the level of contraceptive use increases with family size -- in most cases very sharply -- among women with zero to three children. In general, there is very little further increase with family size in the level of contraceptive use once a moderate family size has been reached and, in many countries, the level of use among women with large families is lower than among those with a moderate number of children. These variations are evidently influenced by the age of the woman. As discussed later, older women who tend to have large families are less likely to be using contraception than are those in the middle years of the reproductive period.

Contraceptive use is relatively high among women with small families, especially in most of the Latin American countries. However, in no country does contraceptive use increase so sharply and regularly with family size as does the stated desire for no more children; 74/ in most of the countries, among women with small families (0-2 children), the percentage of exposed women using contraception is higher than the percentage who say that they want no more children. Thus, contraception in developing countries should not be viewed solely as a practice that couples adopt in order to limit their family size; it is also used for birth spacing.

Some of the countries in which the level of use shows little or no tendency to decline at higher family sizes are those in which the overall level of use is very low -- Nepal, Bangladesh, Pakistan and Kenya. In these countries, fewer than 20 per cent of women with seven or more children were using contraception at the time of the interview.

Although there are some general differences between the Latin American and the Asian countries in the shape of the curves displayed in figure 2.2, it cannot be said that there is a single Asian pattern or a single Latin American pattern. In most of the Asian countries, even those with a relatively high level of use overall, few childless women -- 10 per cent or fewer, with the exception of Korea -- were currently using contraception,

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74/ See the section of this report, dealing with desire for more children in developing countries.

Table 2.22 Distribution of exposed women according to selected variables, in specified WFS countries[a]

Variable	Bangla-desh	Fiji	Indo-nesia	Jordan	Rep of Korea	Malay-sia	Nepal	Pak-istan	Group I. a/ Phili-ppines	Sri Lanka	Thai-land	Colom-bia	Costa Rica	Domin-ican Rep.	Guy-ana	Jama-ica	Mexico	Pan-ama	Peru
Sample Size c/	4645	3314d/	5638	2337	3866	4487	4325	3334	6684	4709	2569	2323	2222 e/	1378	2735	1939	4107	2257e/	3853
									(in per cent)										
Number of living children																			
0	15.7	9.8	12.2	6.6	4.4	5.3	21.8	15.4	4.0	7.6	6.8	6.0	4.3	9.5	12.2	12.4	5.8	4.6	3.3
1	16.2	12.9	19.9	8.5	12.9	11.5	19.3	14.3	11.6	16.4	17.8	13.8	15.9	13.3	14.3	18.2	12.1	11.9	13.0
2	15.0	14.9	18.4	11.2	18.7	14.8	17.5	13.8	15.8	16.4	18.8	17.5	20.7	14.8	13.9	16.8	16.1	17.5	18.1
3	14.1	14.6	15.1	11.0	21.9	15.1	15.9	13.5	16.1	15.8	16.4	15.3	15.7	15.1	13.2	13.0	14.9	16.8	17.1
4	12.0	13.0	12.3	11.5	19.1	12.1	11.4	11.6	14.6	12.8	12.9	11.5	10.9	12.0	11.4	9.4	13.1	14.0	13.6
5	10.5	34.8	9.0	10.5	12.6	10.9	6.8	10.4	11.1	10.5	9.7	10.1	8.9	35.4	9.7	8.2	11.0	11.4	12.5
6	7.2		6.2	11.4	6.4	8.4	4.0	9.2	9.3	7.1	7.2	7.3	6.4		7.7	6.7	8.1	7.7	9.2
7+	9.3		7.0	29.2	4.1	21.8	3.3	11.8	17.6	13.3	10.5	18.5	17.2		17.6	15.2	19.1	16.1	13.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of living sons																			
0	30.8	21.3	30.0	16.3	16.0	17.4	37.6	26.8	16.1	22.4	21.4	19.3	18.9	23.3	24.9	26.9	18.0	16.9	17.5
1	25.4	27.0	31.2	19.0	30.9	26.8	29.3	25.3	26.2	28.4	31.1	26.9	30.7	25.9	25.4	27.0	26.1	27.8	28.4
2	19.5	21.3	19.1	19.5	31.5	23.2	18.5	20.2	23.3	21.8	22.5	21.6	20.7	20.8	20.0	19.5	22.7	23.1	24.0
3	12.8	14.8	10.9	16.7	14.7	15.6	9.4	13.4	16.3	14.0	12.6	13.9	12.6	13.5	12.5	11.3	14.9	15.6	15.1
4	7.1	8.0	5.7	13.5	5.0	9.5	3.6	8.0	9.3	7.8	7.0	8.9	7.5	7.6	7.5	7.6	9.1	9.2	8.2
5+	4.4	7.5	3.2	15.0	1.9	7.6	1.5	6.3	8.7	5.6	5.3	9.3	9.5	8.9	9.8	7.7	9.3	7.4	6.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Desire for more children																			
Want more or undecided f/	36.0	48.9	60.4	58.0	25.9	53.8	70.3	57.3	45.6	37.8	38.8	38.7	47.9	47.9	47.0	52.2	44.2	37.4	39.1
Want no more	64.0	51.1	39.6	42.0	74.1	46.2	29.7	42.7	54.3	62.2	61.2	61.3	52.1	52.1	53.0	47.8	55.8	62.6	60.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Type of place of residence																			
Urban	7.8	37.1	16.2	70.9	39.4	31.5	2.2	25.6	33.6	18.9	15.3	64.3	50.6	48.5	36.3	49.6	58.8g/	56.3	65.3
Rural	92.2	62.6	83.8	29.1	60.6	68.5	94.5	74.4	66.4	81.1	84.6	35.7	49.4	51.5	63.7	50.4	41.2	43.7	34.7
Not stated	0.0	0.3	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 2.22 (continued)

Variable	Bangladesh	Indonesia	Jordan	Rep. of Korea	Malaysia	Group II. h/ Nepal	Pakistan	Sri Lanka	Thailand	Colombia	Guyana	Panama	Peru
Sample Size	4645	5638	2337	3866	4487	4325	3334	4709	2569	2323	2735	2257	3853
Respondent's education													
0 years	76.1	56.1	46.3	16.7	31.9	94.9	89.0	18.7	17.6	15.2	3.7	7.4	28.4
1 - 3 years	8.4	16.4	6.6	10.8	18.1	1.5	2.1	17.3	5.8	37.0	12.9	14.8	24.5
4 - 6 years	11.7	20.6	22.5	41.2	36.4	2.1	5.2	28.0	69.0	29.8	47.3	38.8	24.1
7 - 9 years	2.3	3.7	14.3	19.1	7.3	0.7	2.0	20.0	2.4	12.1	29.8 i/	17.1	8.5
10 + years	1.3	3.2	10.4	12.2	6.2	0.4	1.7	16.0	5.1	5.7	5.8	21.9	14.5
Not stated or other	0.2	0.0	0.0	0.1	0.0	0.5	0.0	0.0	0.1	0.2	0.5	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Husband's education													
0 years	54.7	27.4	19.4	7.9	10.9	68.2	56.9	6.6	10.9	14.6	3.1	6.2	10.0
1 - 3 years	10.7	23.4	5.8	4.7	16.3	13.0 j/	4.9	14.8	3.7	35.2	10.6	15.2	25.6
4 - 6 years	16.1	34.6	31.1	27.1	48.1	6.9	16.2	33.2	67.2	29.7	47.2	36.3	30.8
7 - 9 years	8.3	6.8	19.8	25.6	11.9	6.5	9.8	25.6	3.5	11.6	21.4 k/	16.4	9.7
10 + years	8.8	7.8	23.8	34.5	12.5	5.2	12.1	19.7	13.1	8.6	12.6	25.8	23.9
Not stated or other	1.3	0.0	0.0	0.2	0.5	0.1	0.0	0.2	1.7	0.3	5.0	0.0	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Respondent's occupation													
Housework only	90.7	38.6	87.6	45.8	55.5	32.6	82.6	61.4	16.1	68.0	... l/	60.2	47.9
Professional, clerical	0.4	2.0	3.4	1.9	3.7	0.0	0.5	4.4	4.0	6.4	...	17.9	6.9
Service	3.5	12.7 m/	0.3	3.3	2.9	0.0	1.3	0.7	1.7	7.6	...	11.7	4.6
Sales and labour	4.3	5.2 n/	3.5	17.2	9.3	3.5	10.1	8.5	17.4	14.0	...	8.3	20.7
Agriculture	1.1	41.4	5.2	31.7	28.5	63.7	5.5	24.9	60.8	4.0	...	1.9	19.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Whether any child died o/													
No	44.4	60.3	64.0	77.4	76.5	50.5	47.1	75.1	70.8	67.7	73.9	78.5	59.4
Yes	55.6	39.7	36.0	22.6	23.5	49.5	52.9	24.9	29.2	32.3	26.1	21.5	40.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.1	100.0	100.0

Table 2.22 (continued)

Notes:

a/ Data were taken from WFS First Country Reports of tabulated from individual interview tapes. Excludes women who are currently unmarried, currently pregnant or who believe themselves to be infecund, but includes those sterilized for contraceptive purposes. Except as noted, age range is 15-49 or under 50 years.

b/ Group I includes developing countries for which a report or data tape was available. The preliminary report available for Kenya did not include the information required for this table.

c/ Percentages may not add to 100.0 because of rounding.

d/ Excludes women practicing post-partum abstinence.

e/ Age 20-49 years.

f/ Includes women who did not state whether they wanted more children.

g/ "Urban" comprises areas with 2500 or more inhabitants.

h/ Confined to countries for which a data tape was available.

i/ Includes 3.5 per cent of those who attended secondary or higher, but year not stated.

j/ Includes 8.4 per cent of those who attended primary, but year not stated.

k/ Includes 4.1 per cent of those who attended secondary or higher, but year not stated.

l/ Not yet available.

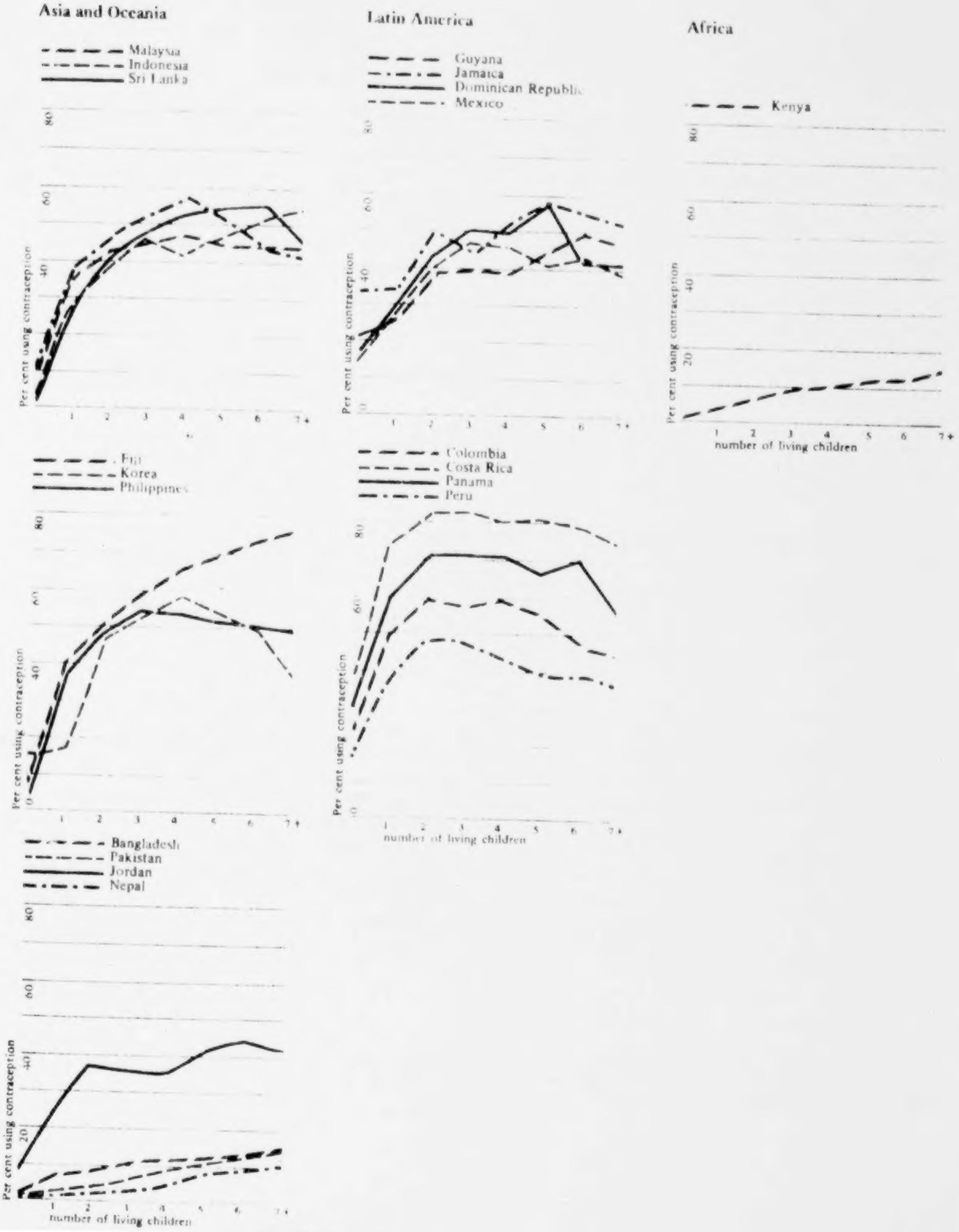
m/ Sales and service

n/ Skilled and unskilled.

o/ Based on exposed women with at least one live birth.

Figure 2.2
Percentage of exposed women currently using contraception by number of living children

20 Wordl Fertility Survey Countries



while in all of the Latin American countries more than 10 per cent of the women with no children were using a method. In several Latin American countries, over 30 per cent of the childless women were using. 75/

In most Asian countries, there is a positive association of family size with level of use, at least until the family contains three or four children, while in many Latin American countries, use is not greater among couples with 3 or more children than among those with two children.

There is an interesting difference between the two English-speaking countries in or near the Caribbean and the other Latin American countries. In Guyana and Jamaica, women with one child are only slightly more likely to be using contraception than are women with no children, while in the other Latin American countries use among women with one child is much more frequent than among childless women. This difference is related to cultural differences in marriage patterns. In Jamaica, Guyana, and some other countries in or near the Caribbean, visiting unions, which are less stable than either common law or legal unions, are very common, especially among young women. Childless women in visiting unions are much more likely than childless women in other types of unions to be using contraception. 76/ In both Guyana and Jamaica over 40 per cent of childless women in visiting unions were using contraception. This may represent an attempt to delay childbearing until there is a prospect of forming a more stable family. Conversely, it is common for women to enter more stable unions only after becoming pregnant or bearing a child.

Korea exhibits a pattern distinct from that of all the other Asian countries. The level of use among women with no children is higher than in other Asian countries, and there is little difference in use level between women with zero children and those with one child. Use increases rapidly after one child to a peak among women with four children and then declines substantially with further increase in family size.

Age

Although the level of current use is fairly high among younger married women in many countries, suggesting fairly frequent spacing of births, 77/ it is generally highest among women in the middle of the reproductive ages, from 25-39 years. Older women are less likely to be using, even when women who believe themselves to be infecund are excluded from the base population. (This is examined more directly below.)

75/ Contraceptive use figures for women with 0 live births (not shown) differ little from those for women with 0 living children.

76/ Jamaica First Country Report, op. cit., vol. I, p. 74; Guyana First Country Report, op. cit., vol. I, p. 59.

77/ See World Population Trend and Policies, 1979 Monitoring Report, vol. I, Population Trends (United Nations publication, Sales No. E. 79.XII.4) in press, chapter 2.

There are several possible reasons for the typical curvilinear relationship between contraceptive use and age. Older women may be less likely to use contraception because of lack of information or because of adherence to traditional norms which discourage contraceptive use. Young women may be less subject to the influence of tradition, but some may also be relatively poorly informed about contraception. Furthermore, many of them will still wish to have more children. These possibilities may also apply in respect to the variations by parity noted earlier; parity and age tend to be correlated.

It should be noted that the differences among countries in levels of contraceptive use among married women of reproductive age, unlike differences in cumulative fertility, can be accounted for only to a minor extent by differences in age or other demographic variables (table 2.23). 78/ Demographic variables are related to contraceptive use within each population, but there are typically very large differences among population within each age or family size category. 79/

Contraceptive use and desire for more children

Demographic variables such as age and family size affect current contraceptive use at least partly through their relationship to a couple's desire for more children. However, the desire to limit family size is not the only reason for using contraception. For examples, couples may use contraception in order to insure adequate spacing between births or because the wife is in poor health and wishes for that reason to avoid pregnancy. The discussion above relative to the comparatively wide use of contraception among women with small families suggest birth spacing as the reason (and, many Latin American countries, also in order to postpone the start of childbearing).

78/ For this standardization, Bangladesh was used as the model. Most women marry at young ages in Bangladesh, and fertility early in marriage is low relative to that in many other countries because many recently-married women are still in a state of adolescent subfecundity. Primarily for this reason, a relatively high percentage of Bangladeshi exposed women are childless or have only 1 or two children; the high level of mortality in Bangladesh also contributes to this. Premarital pregnancy and childbearing in some of the Latin American countries contributes to the low proportion of exposed women who are childless in these countries. The comparatively high proportion in Bangladesh of women with small families is responsible for the fact that, for most countries, the standardized percentage using contraception is lower than the unstandardized percentage.

79/ A similar conclusion is reached using a different technique, in A.I. Hermalin and W.M. Mason, "A strategy for the comparative analysis of WFS data with illustrative examples", mimeographed paper prepared for a meeting of the United Nations Working Group on Comparative Analysis, 31 October - 2 November 1978, UN/UNFPA/WFS. II/18.

Table 2.23 Percentage of exposed women currently using contraception, by number of living children, for selected WFS countries a/

Country	Total		Number of living children							
	Unstandardized	Standardized b/	0	1	2	3	4	5	6	7+
Africa										
Kenya	9	8	2	4	8	10	10	13	12	15
Asia and Oceania										
Bangladesh	10	10	3	7	8	11	12	13	15	16
Fiji	56	51	10	39	52	56	66	69	72	75
Indonesia	37	36	4	27	40	46	43	48	51	54
Jordan	37	32	7	27	37	36	36	43	45	43
Republic of Korea	45	39	16	17	47	54	57	54	49	37
Malaysia	42	38	10	37	43	45	47	45	45	46
Nepal	3	4	0	1	2	3	5	9	9	11
Pakistan	7	7	0	2	4	7	9	12	14	16
Philippines	48	42	6	35	49	55	54	52	51	48
Sri Lanka	41	38	4	26	41	48	53	53	55	47
Thailand	45	42	10	38	47	53	58	52	45	43
Latin America										
Colombia	52	49	24	50	60	57	59	56	47	45
Costa Rica	78	73	39	75	82	83	80	82	78	76
Dominican Republic c/	42	39	15	30	44	51	50	57	41	41
Guyana	38	36	22	26	37	39	38	46	49	47
Jamaica	45	45	32	34	50	45	52	57	55	51
Mexico	42	39	13	38	49	47	46	41	43	39
Panama	65	61	31	58	70	73	71	67	69	58
Peru	41	38	16	36	49	48	43	38	39	36

Notes:

a/ Data taken from WFS First Country Reports and from data tapes.

b/ Standardized on the distribution of exposed Bangladeshi women by number of living children.

c/ The percentage using differs slightly from that shown in other tables because of small descrepancies in the source tables and because of rounding errors.

In most of the countries 80/ between 50 and 65 per cent of the exposed women said that they did not want more children. Lower percentages were reported in Indonesia, Jordan, Malaysia, Pakistan and Guyana (40 to 49 per cent) and in Nepal (30 per cent) and a higher percentage (74 per cent) in the Republic of Korea.

Table 2.24 shows the percentage of exposed women using contraception, among those who want more children (or are undecided) and among those who want no more. It distinguishes use of any method and use of a modern method: pill, **injectible**, IUD, condom, and sterilization, i.e., techniques offered most often by family planning programmes.

Exposed women who want no more children are, as would be expected, more likely than others to be using contraception; in all countries shown in table 2.24, at least one-half of the current users were women who wanted no more children.

In 16 of the 19 countries, at least 40 per cent of women who said that they did not want more children were not using any method of contraception; in all but one of the countries (Costa Rica) over one-fourth of such women were not using. Statistics presented later show that this gap between stated desire to stop bearing children and current contraceptive practice is, in most countries, heavily concentrated among women with little or no education.

In countries in which contraception is relatively frequent among women who want no more children, it is also relatively frequent among those who want more children. The correlation among the 18 countries (excluding Bangladesh) between "proportion using among those who want more children" and "proportion using among those who want no more" is over .8. In other words, where use of contraception is fairly widespread, both birth spacing and family limitation are commonly the goal.

Use of traditional methods is not confined to women who want more children (and who might for this reason be less highly motivated to practice contraception effectively), although it generally comprises a slightly larger proportion of total use among them than among the others (figure 2.3). Where use of traditional methods is prevalent among women who want more children, it is also found among those who do not.

80/ Excluding Bangladesh and Kenya, for which comparable information was not available at the time of writing. Figures are shown for Bangladesh, although in that country some women were asked, "Do you want another child soon?"

Table 2.24 Percentage of exposed women currently using any contraceptive method and percentage using method, by desire for more children, selected WFS countries a/

Country	Percent using, among:			Percentage distribution of exposed women				
	Total	Want more b/ or undecided	Want no more	Total c/	Want more b/ and not using contraception	Want more and using contraception	Want no more and not using	Want no more and using
Asia and Oceania								
Bangladesh d/								
Any method	10	2	14	100	35	1	55	9
Modern method	6	1	9	100	36	0	59	6
Fiji e/								
Any method	56	38	74	100	30	18	13	38
Modern method	49	30	66	100	34	15	17	34
Indonesia								
Any method	37	26	53	100	45	16	18	21
Modern method	32	23	46	100	47	14	21	18
Jordan								
Any method	37	22	59	100	45	13	17	25
Modern method	26	14	42	100	50	8	24	18
Republic of Korea								
Any method	46	16	56	100	22	4	33	41
Modern method	35	12	44	100	23	3	42	32

Table 2.24 (continued)

Country	Percent using, among:			Percentage distribution of exposed women				
	Total	Want more b/ or undecided	Want no more	Total	Want more b/ and not using contraception	Want more and using contraception	Want no more and not using	Want no more and using
Malaysia								
Any method	42	34	52	100	26	18	22	24
Modern method	31	25	37	100	41	13	29	17
Nepal								
Any method	3	0	8	100	70	0	27	3
Modern method	3	0	8	100	70	0	27	3
Pakistan								
Any method	7	1	15	100	56	1	36	6
Modern method	5	1	11	100	57	1	38	5
Philippines								
Any method	48	33	60	100	31	15	22	33
Modern method	21	12	29	100	40	5	39	16
Sri Lanka								
Any method	41	22	54	100	30	8	29	33
Modern method	24	9	34	100	34	3	41	21
Thailand								
Any method	45	29	56	100	28	11	27	34
Modern method	42	26	52	100	29	10	30	32

Table 2.24 (continued)

Country	Percent using, among:			Percentage distribution of exposed women				
	Total	Want more b/ or undecided	Want no more	Total	Want more b/ and not using contraception	Want more and using contraception	Want no more and not using	Want no more and using
Latin America								
Colombia								
Any method	52	45	56	100	21	17	27	34
Modern method	37	32	40	100	26	13	37	25
Costa Rica								
Any method	78	71	84	100	14	34	8	44
Modern method	65	57	71	100	20	27	15	37
Dominican Republic								
Any method	41	25	57	100	36	12	23	29
Modern method	30	15	43	100	41	7	30	22
Guyana								
Any method	38	29	46	100	32	13	29	25
Modern method	29	25	43	100	34	11	31	23
Jamaica								
Any method	46	39	55	100	33	19	22	27
Modern method	43	35	52	100	34	18	23	25
Mexico								
Any method	42	34	48	100	29	15	29	27
Modern method	32	26	37	100	33	11	35	20

Table 2.24 (continued)

Country	Percent using, among:			Percentage distribution of exposed women				
	Total	Want more [b/] or undecided	Want no more	Total	Want more [b/] and not using contraception	Want more and using contraception	Want no more and not using	Want no more and using
Panama								
Any method	65	50	74	100	19	19	16	46
Modern method	55	40	65	100	23	15	22	41
Peru								
Any method	41	33	46	100	26	13	33	28
Modern method	15	11	17	100	35	4	51	10

Notes:

a/ Data taken from WFS First Country Reports and Standard Recode Tapes.

b/ Want more children or are undecided, or desire for more children not stated.

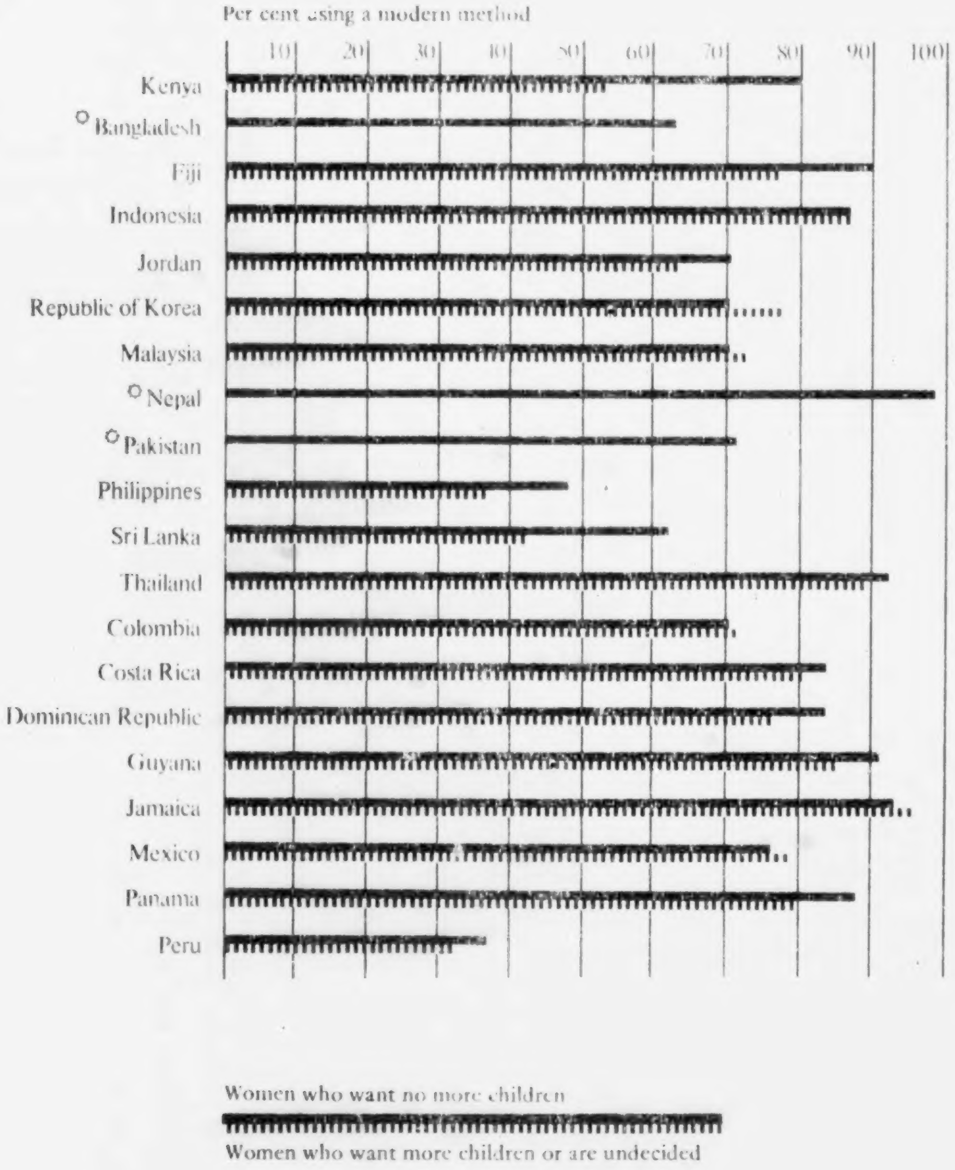
c/ Percentages may not add to 100 because of rounding.

d/ Some women were asked "Do you want another child soon?"

e/ Base excludes those practicing post-partum abstinence.

Figure 2.3
Percentage of current contraceptive users who are using a modern method by desire for more children

20 World Fertility Survey Countries



○ Percentage not shown for women who want more children because of small number of contraceptive users.

In most of the Latin American countries, the level or use is quite high among women who want more children, ranging from 25 per cent in the Dominican Republic to 71 per cent in Costa Rica, an indication that deliberate birth spacing is common. In the Asian and Oceanic countries, the level of use among women who want more children is generally lower, ranging from 0 in Nepal to 38 in Fiji and suggests that contraception is used more for limiting than for spacing births. This compares to a range in the percentage using in the Latin American countries of 45 (in Guyana) to 85 (in Costa Rica) among exposed women who want no more children and to a range in the Asian and Oceanic countries of 8 (in Nepal) to 74 (in Fiji) among such women.

The extent to which lengthy breastfeeding is practiced may be an important determinant of demand for contraception for the purpose of spacing births. It is clear, though, that use of contraceptives among women who want more children varies among countries closely with the level of use among women who want no more, suggesting that most of the inter-country difference in the level of use among women who want more children is due to the same factors that influence use among women who want no more children. However, among these countries, the practice of extended breastfeeding does show a fairly strong negative relationship to the level of use among women who want more children relative to the level of use among women who want no more children. Figure 2.4 shows the percentage of women who breastfed for more than 6 months during the last inter-birth interval, plotted against the ratio between the level of current contraceptive use among women who want more children and the level among women who want no more children.

Differences in contraceptive use among education and rural-urban residence groups

Preliminary results of work in progress suggest that, in the developing countries, these are not the only important variations among countries in the incidence of contraceptive use; that wide differences are also to be found among socio-economic and residence groups. In some countries, regional, ethnic or religious differences in contraceptive use also appear to be important.

In respect to 13 countries for which World Fertility Survey data tapes were available, a multivariate analysis 81/ confirmed that contraceptive use rises with educational attainment. For many of the countries, there were 25 or more percentage points difference in use prevalence among "exposed" women with no education and those with 10 or more years schooling. This difference was found after the introduction of statistical controls

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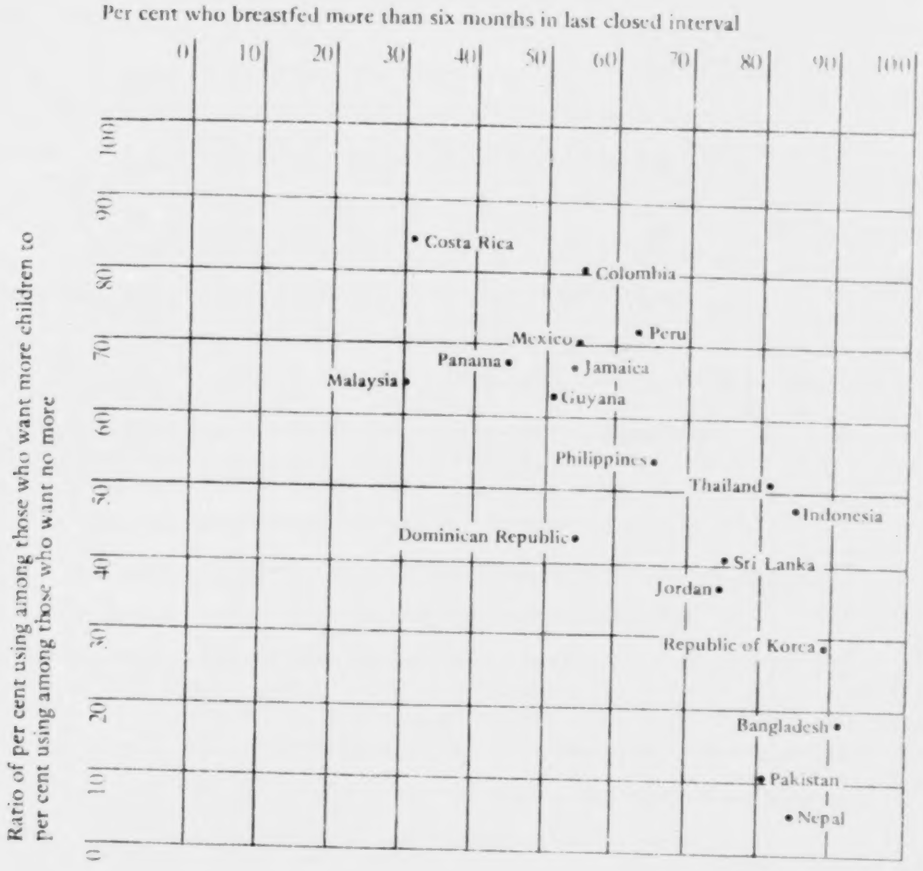
81/ The statistical routine used was the Multiple Classification Analysis (MCA) option in Statistical Package for the Social Sciences (SPSS), unlike some other MCA programmes, the SPSS routine allows inclusion of both continuous and categorical variables. See, N.H. Nie *et. al.*, *Statistical Package for the Social Sciences* (New York) McGraw-Hill, 1975; F.M. Andrews, *et. al.*, *Multiple Classification Analysis*, (Ann Arbor, Michigan, The University of Michigan, 1973). Identical results could have been obtained using a multiple regression programme, following the procedures described in J.G. Cleland, *et. al.*, *op. cit.*

Figure 2.4
Relative level of contraceptive use among exposed women who want more children and among those who do not want more
by precentage of women who breastfed for more than six months on the last closed birth interval

18 World Fertility Survey Countries



Data not available at present for Fiji, Kenya.
For Bangladesh, per cent who breastfed excludes women who breastfed until the child died
For the Republic of Korea, Nepal, Pakistan,Costa Rica,Dominican Republic,Mexico and Panama data pertain only to women whose last closed birth interval did not exceed five years.

for the woman's age, effective family size and (rural-urban) place of residence (figure 2.5). The data show that the wife's education tends to have greater influence on contraceptive use than does husband's schooling; that the differentials are consistently weaker in Asia (excluding Jordan) than in Latin America where education is more widespread on a higher level; and that the size of the educational differential in contraceptive use is generally greater after adjustments have been made for the demographic factors. One factor that explained the differential was knowledge of an outlet for contraceptive information and supplies; such knowledge was more apparent among better educated women.

In regard to rural-urban residence, in each of the 13 countries (excluding Indonesia) contraceptive use was significantly greater in urban than in rural areas. This was true after the demographic variables were controlled, with the more pronounced gaps occurring in Jordan, Colombia, and Peru for which percentages in rural-urban use prevalence differ by 33, 29 and 37 points, respectively. The woman's age and number of living children had very little effect upon the size of the rural-urban differential, which was established when controls for age and effective family size were introduced. But, significantly, the differentials were considerably smaller when account was taken of the effect of husband's and wife's education (figure 2.6).

In three countries, Jordan, Colombia and Peru, which had very large differentials before education was controlled, use was higher in urban areas by 15 to 20 percentage points than it was in rural areas, net of the effects of the educational composition of the population. In the Republic of Korea the difference after control for education is insignificant at the .05 level, and in Sri Lanka and Guyana the difference is of borderline significance ($.01 < p < .05$). In Indonesia, women in rural areas appear more likely to use contraception than women living in urban areas, given the relative educational attainment of couples in rural vs. urban areas (and controlling also for the demographic variables); the difference between rural and urban areas was, however, not very large (8 percentage points).

By comparison with the large education differentials examined earlier, the differential by type of place of residence appears to be of moderate size in many, though not all, countries. Some of the WFS surveys did not cover the most remote areas of the country; thus it is possible that the differentials are really somewhat larger, in some cases, than these data indicate. 82/ A simple distinction between rural and urban areas does not, of course capture the entire effect of size of place of residence which varies along a continuum.

82/ The Indonesian survey covered only Java and Bali, approximately two-thirds of the total population, while the Malaysian survey covered Penisular Malaysia. Several other countries omitted smaller fractions of the total population.

Figure 2.5
Percentage of exposed women currently using contraception by husband's and wife's education

13 World Fertility Survey Countries

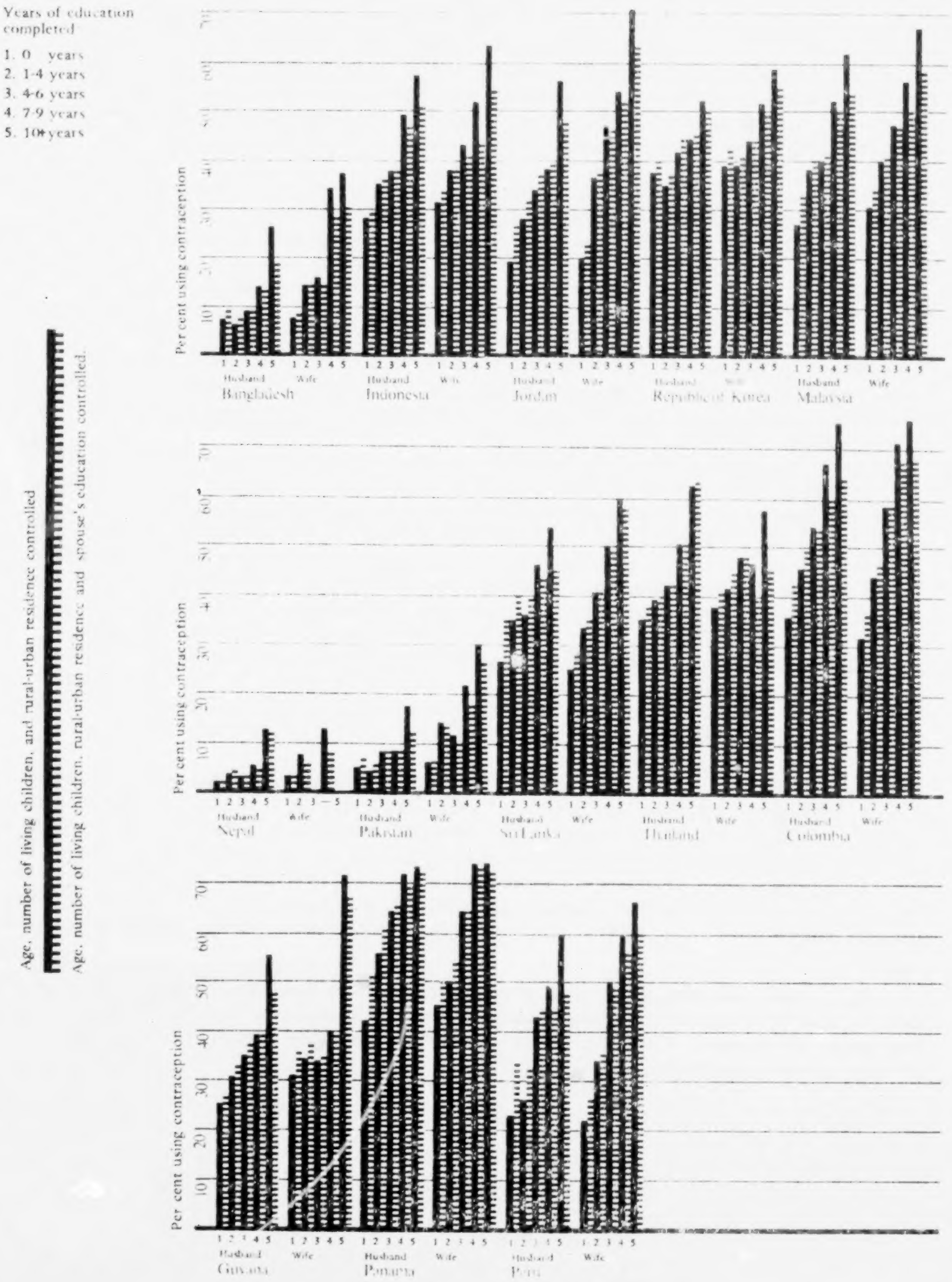
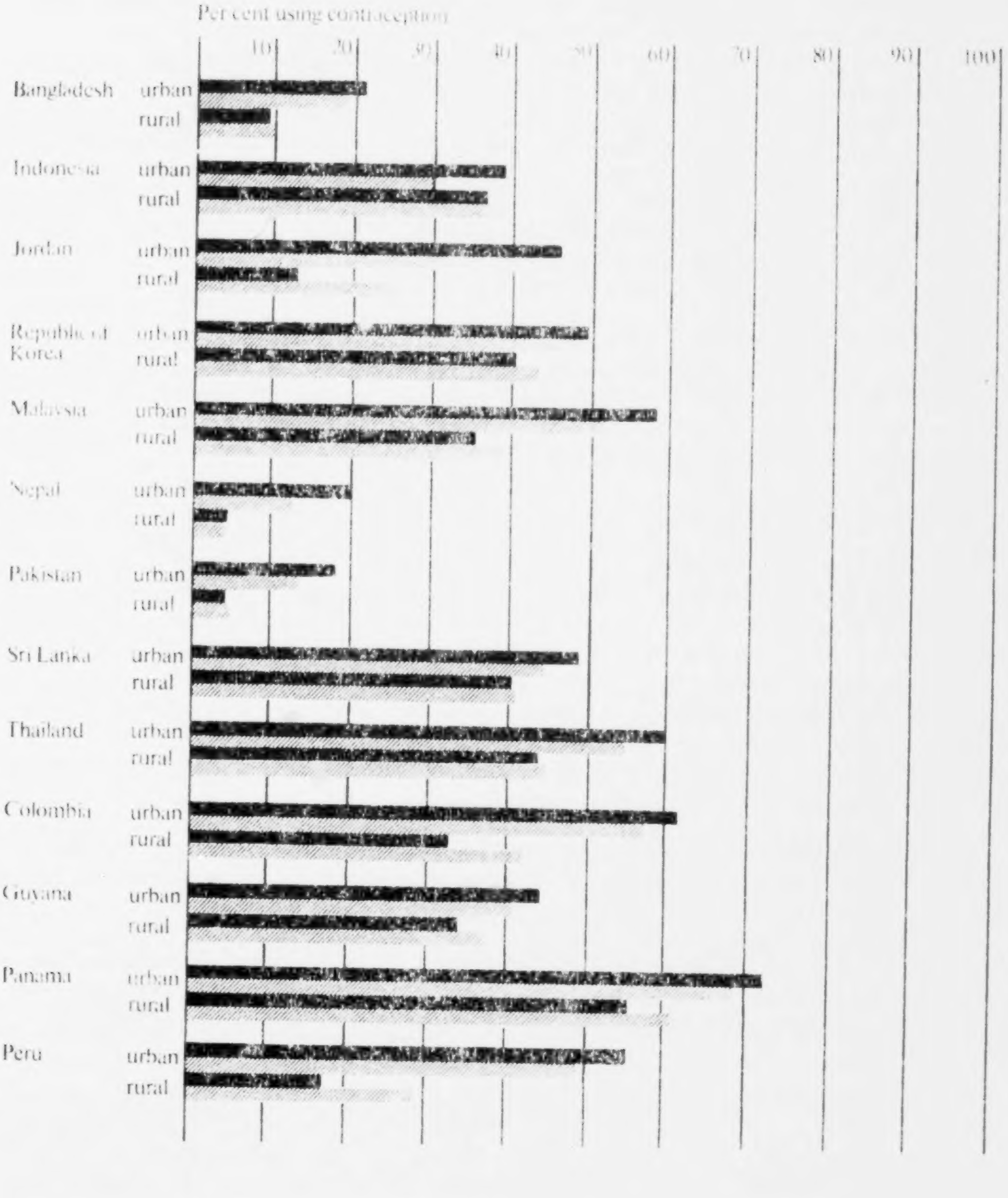


Figure 2.6
Percentage of exposed women currently using contraception
by rural-urban residence

13 World Fertility Survey Countries



Chapter 3

LEVELS AND TRENDS OF NUPTIALITY

A. Introduction

The age at which women marry, the proportion of women within the child-bearing ages that are married at any given time, the relative number in each birth cohort that ultimately marries, and changes in these phenomena over time have been among the important determinants of fertility levels and trends. As family size norms decrease and populations become increasingly more desirous of and adept at effectively regulating family size, age at marriage has little bearing upon completed fertility, although it may play a modest role in the fluctuations of crude birth and general fertility rates. However, in most if not all of the developing countries, the effective practice of fertility regulation is not diffuse, and child-bearing has not yet become elective for the majority of couples, as it has for those in the economically more advance nations. Thus, in these countries, age at marriage still has an important bearing upon completed family size.

In populations of this type, which are found almost exclusively in the economically less advanced countries, female celebacy is infrequent, as the value placed upon marriage and childbearing is very high and women have access to few other, if any, acceptable roles. Thus, most women enter a legal or other socially acceptable union.

The proportion married among women of reproductive age is a determinant of aggregate fertility in most developing countries. But in some, child-bearing is customary in unions other than those acknowledged by formal marriage. In many developed countries, too, standards have changed since the mid-1960's or later, so that many women, particularly young ones, bear children while single, and others form a consensual union, which may or may not be a preliminary step to marriage with the same partner. The union often produces children. Indeed, the new patterns of behaviour with respect to marriage and its dissolution are among the most important demographic changes to have occured in many developed countries for some time.

Concomitant with the easing of social restrictions against sexual congress outside of legal marriage in some economically more advanced countries, there has been a sharp rise in the incidence of separation and divorce but with frequent remarriage. Divorce has been adopted as a solution to marital difficulties with increased frequency also in some of the developing countries that have not experienced a growing tendency for couples to form consensual and other, less binding, unions prior to or in preference to legal marriage.

In light of the foregoing, it would appear that, for many developed countries, legal marriage and factors relevant to its formation are no longer the appropriate framework within which to analyse fertility. For many developing countries, too, particularly in Africa and Latin America other types of unions contribute a large share of aggregate fertility and, thus, should be analysed as a part of research on nuptiality.

This report focuses upon ages at marriage and proportions married, aims to shed some light on the prevalence of consensual and other non-legal unions in developing and developed countries, and discusses remarriage in the countries for which data could be examined. Owing to the unavailability of relevant statistics for a sufficient number of developing countries, the incidence and trends of divorce are not discussed in this report.

B. Developing Countries

1. Africa

The nuptiality data that are available for African countries from most resources are generally of poor quality and do not necessarily reflect conditions in recent years. Further, they are generally insufficient to assess trends. Throughout Africa, there is great variation in marriage customs and traditions and, because of this, conditions in any one country are probably not representative of the region or even of a sub-region.

a. Proportions never married and age at marriage: analysis of census and ad hoc survey data

Insofar as can be judged from available data, it appears that marriage is nearly universal in Africa and that most women in Africa South of the Sahara marry at fairly early age (table 3.1). Among seven countries, the singulate mean age at marriage for a year 1967 and later ranges from 16.6 to 23.4. Measures for the two North African countries for which data are accessible are within these margins, being 19.1 and 23.3, respectively for Morocco (1971) and Tunisia (1975).

Statistics in table 3.1 show that, at around the time specified, there was no uniformity as to the proportions of women in the countries of Eastern Africa that are represented who married before attaining their twenty-fifth year. In Tanzania, Uganda and Zambia, women clearly married very early, the singulate mean age at marriage for women in these countries around 1967-70 varied only from 16.6 to 18.2 years. In Reunion, at about that time, women evidently married much later; the singulate mean for the year 1967 was 23.4 years. The same is true with respect to Mauritius, where age at entrance into first marriage appears to have been advanced over the years 1962-76. A similar trend is noteworthy in Morocco and in Tunisia.

Except for Reunion, in the countries for which data permit observation of change over time, there appears to have been a fairly marked advancement in age at marriage for females, but only a slight delay in marriage among males. Thus, in Mauritius a gap of 6.3 years in age at marriage between males and females in 1962 narrowed to 4.8 years in 1972. An advancement by 2.5 years in age at marriage for Mauritius females may be attributed, at least in part to the substantial increase in the number of women attending school during the inter-censal period. An important rise in the age of females at marriage also appears to have taken place in Tunisia. 1/ Analysis of results of the 1966 and 1975 censuses showed a rise in the average age at which Tunisian women married of from 20.9 to 23.3 in the nine year inter-censal interval. The change was no doubt aided by government policies effected in 1967 which favoured lower fertility and the advancement of women. Of course, the singulate mean age at marriage does not tell precisely the age at which women marry. A look at data on median age at first marriage (table 3.2) shows a fluctuating trend in Mauritius, with a downward movement from 1970 onward, while Reunion appears to have realized aslight advancement in age at first marriage in the early 1970's. However, in both countries, women marry for the first time at relatively advanced ages. In Egypt, median age at first marriage is much lower and, following a slight rise during the 1960's, appears to have subsequently declined.

As to proportions never married, at the most recent census, about 46 per cent of the women in the age group 20-24 years were still unmarried in both Mauritius and Tunisia. It will be noted that, in some countries, the relative number of women who had not married by age 49 increased, while in others there were slight declines. In Mauritius (1972) and Tunisia (1975), proportions that remained single in the age group 45-49 years were small, 3.7 and 1.6 per cent, respectively (table 3.1).

Compared with the situation at the previous census, in each of these countries, there appears to have been a rising tendency for women to postpone marriage. The changes in the proportion of never married young women in the age groups 15-19 and 20-24 years in Mauritius are especially remarkable, particularly in the age group 20-24 years, where the proportions having increased by about 22 and 68 per cent, respectively, during the ten-year period. An advancement in the age at which Tunisian women marry is also noticeable as proportions single in the 15-19 and 20-24 age groups increased by 10 and 68 per cent, respectively, in the nine-year period. A sharp rise is notable, too, for Morocco between 1960 and 1971. In that country, single women aged 20-24 years increased from 7.9 to 18.3 per cent of the total in that age group.

It may also be seen from table 3.1 that, in the African countries represented, men marry at considerably older ages than is the case with females, except in Rwanda where the differences in singulate mean

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1/ Robert J. Lampham, "Family planning and fertility in Tunisia", Demography, vol. 7, No. 2, May 1970, pp. 241-253; Jacques Vallin, "La nuptialité en Tunisie", Population, (Paris), 26, Special Issue, March 1971, pp. 250-266.

age at marriage between males and females is only two and one-half years. Not only is it seen that the men marry later but, in most countries, relatively more of them are still single at ages 45-49 years than is the case with women.

Results of surveys conducted by the Cairo Demographic Centre in strata of two African cities also revealed wide differences in age of females at marriage. The median age at marriage in population strata in Kimtambo (Kinshasa) and for a sample in Tororo (Uganda) were, respectively, 22.0 and 18.7 years. 2/ These data obviously are not indicative of the average age at which women in the whole of Zaire and Uganda marry, as they relate to cities or to a stratum within a city. However, they are useful in that, in the absence of more representative measures for these countries, they do afford some insight. In each case, it may be assumed that the median age at which women in the country as a whole marry is somewhat lower than the figures quoted above, mainly because rural women tend to marry earlier than do their urban counterparts.

Preliminary results from a 1978 survey conducted in Kenya as a part of the World Fertility Survey provide some information on Kenyan marriage patterns. Among women who, at the time of the survey, were within the age groups 20-24, 25-29 and 30-34, the median age at first marriage was, respectively, 18.1, 17.5 and 17.1. 3/ These figures do tend to suggest a slight advancement in age at first marriage among the younger women. When it is considered that some never-married women aged 20-24, for example, will eventually marry, the median for that cohort will be even higher. But the same is true with respect to the two older cohorts, so that interpretation of trends from such data can be done only with much caution. 4/

2. Latin America and the Caribbean

In most countries of other regions, except possibly in sub-Sahara Africa, the type of union that is overwhelmingly most common is the legal marriage, the commencement and termination of which may be easily

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2/ M. Sivamurthy and K.S. Seetharam, "Age at first marriage in selected areas of four Arab and African cities", in S.A. Huzayyin and G.T. Acsádi, eds., Family and Marriage in Some African and Asiatic Countries, Cairo Demographic Centre. Research Monograph Series-No. 6, Cairo, 1976, p. 297.

3/ Kenya, Central Bureau of Statistics, Kenya Fertility Survey, Major Highlights, mimeographed document prepared for the WFS Regional Meeting for Countries South of the Sahara, Nairobi, 3-5 September 1979, p. 20.

4/ Ibid.

and clearly demarked. In this region, however, sexual partnerships assume a greater variety of forms - legal marriages, trial marriages, consensual unions, visiting unions or some variation of these - and, apart from legal marriages, the difference between them are, at certain stages, rather nebuluous. However, because all of these union types are very common and because one often leads to another without the introduction of any formality, the marital status of a great many women in these countries may not be clearly definable nor accurately reported nor reported identically by both partners. For example, women in consensual unions may either report their status accurately or say that they are "married", whereas the men have a tendency to report themselves as being single.

Although two types of unions - legal and consensual marriages - are recognized in most countries of Latin America and the Caribbean, not all of the countries provide for the collection of information on consensual unions at the census enumeration and, because there is no legal formality, the unions are not registered. In none of them are data available on visiting unions or trial marriages, except when obtained through sample surveys. However, consensual unions imply stability of partnerships, just as do legal marriages, and the couple also shares living quarters and rear children. While women in the less stable, visiting unions do not share a common residence with their partners, they do bear and rear children.

One shortcoming of the data arises from the fact that women in consensual unions may on one occasion report their status as consensually married or, simply, "married" and later, when the relationship has been terminated by separation or death of partner, report themselves as single, causing a distortion of both age patterns of nuptiality and the changes over time. These data deficiencies sorely complicate analysis and interpretation of nuptiality conditions in this region.

a. Age at marriage and proportions never-married: analysis of census and *ad hoc* survey data

As determined by the singulate mean age at first marriage, women in this region appear to marry somewhat late, especially if compared with the timing of first marriages among Middle South Asian women and among some in other Asian regions. Indeed, insofar as the data permit observations, it may be said that the values for women in the Caribbean region and in Temperate South America are, on the whole, the highest to be found in developing regions. Around 1970-75, the singulate mean age at marriage of women in these countries ranged from 19.4 in Cuba (1970) to 22.4 in Chile (1970). For some years prior to 1970, values ranging from 25.4 to 29.3 years can be observed in table 3.1 for several Caribbean countries. Within the Caribbean, age of women at first marriage appears to be most advanced in Jamaica, though the data are unfortunately quite old, and lowest in Cuba and Dominican Republic (table 3.1). However, that legal marriage occurs, on the average, at more advanced ages in many countries of this region does not mean that women do not cohabit earlier or that they bear their first child so late. Age at first entrance into a sexual union is much lower, at least in the countries for which data are available. It is possible that women enter legal unions at an advanced age because of time already spent in visiting unions or other types of partnerships, or because they marry only after a birth. This was confirmed by results of field investigation in Jamaica (1972) and in Trinidad and Tobago (1958), which revealed the average age of women at entry into initial union as follows: in a visiting union, age 20.6 in Jamaica and 20.1 in Trinidad and Tobago; in consensual unions and legal marriages, 21.0 and 21.5 and 23.9 and 23.2, respectively, for the two countries. 5/ This suggests a pattern of marital history in which, for many women, movement is from a visiting union to either of the other two, although in many cases, the second type of union is consensual and legal marriage is the final of three steps. 6/

Among eight countries in Latin America and the Caribbean, median age of women at first marriage in 1975 varied within the moderate range of 20.6 to 22.6 years (table 3.2). A 1960 figure for Jamaica indicated very late marriage to be common among women in that country. The region as a whole has been marked by relative stability in the age of women at first marriage, especially during the 1970's, although slight advancements appear to have occurred in Cuba and Panama.

The information provided in table 3.1 suggests that, throughout the region, but especially in parts of the Caribbean and Middle America, relatively large proportion of women fail to marry before attaining ages 45-49.

5/ G.W. Roberts and S.A. Sinclair, Women in Jamaica, Patterns of Reproduction and Family (Kto Press, New York, 1978), pp. 24-26.

6/ Ibid., pp. 33-38.

At younger ages also, it is found that, for many countries, the proportion of women who have never married is comparatively high; among those aged 20-24 years, the values are from 61.8 to 88.2 for four Caribbean countries (1960-1971) and from 49 to 56 per cent in Tropical South America. In 14 of the countries for which the figures could be calculated for at least two dates, no general trend is discernible; in eight, the proportions never-married among women aged 20-24 years increased, but in six the trend was toward larger proportions having married by these ages. Movements in the singulate mean age of females at marriage compliment the changes in proportions never married at the younger ages. It is emphasized, however, that in view of the tendency of women formerly in consensual marriages to report themselves as such while in the union, but to state that they are single (never married) once the union has been dissolved, not much credence can be given to the data on proportions never married at specified ages.

As is generally common, in this region men marry at older ages than do females. However the differences among countries in respect to the relative numbers of males and females that remain single at ages 45-49 are not uniform. The significance of this is uncertain: the measures are derived from proportions single but, as already indicated erroneous reporting of marital status is commonly attributable to women formerly in consensual unions and, in addition, some consensually married men give their marital status as single.

b. Age at marriage and marital stability: results from the World Fertility Survey

Nuptiality statistics for eight countries of this region are available from surveys conducted as a part of the World Fertility Survey. For all of them, except Guyana and Jamaica, mean age at first marriage could be gauged with strong confidence on the basis of a single survey; differences by age groups must be viewed with some care, as the cohorts, especially the younger ones are truncated and subsequent first marriages of women in the cohorts would raise the cohorts mean age at first marriage. However, women in these countries appear to enter unions rather early and the truncation effect upon the cohorts aged 25-29 years and more may not be very significant. Table 3.3 provides data that enable a comparison of mean age at first marriage of women aged 25-29 and 40-44 years at the time of the survey with the relative number of women who married before reaching age 25. On the basis of these data, it would appear that, over the 10 to 30 years to which the figures relate, none of these countries experienced a genuine change in age at first marriage. The slight movement suggested by the measures for Jamaica and Panama must be acknowledged with reservations, owing to the problems involved in defining marital status and to possible errors in the reporting both of current age and of age at marriage. In any case the data can not give evidence of more recent changes, as the women in the younger cohort married roughly eight to ten years, on the average, before the survey.

There are differences among these countries in the frequency of marriage dissolution, in the cause of dissolvement and in the incidence of remarriage. Results of the surveys taken in Guyana and Jamaica do not provide information on causes of marital dissolution, but it can be seen from table 3.3 that, in the two countries, from 50 to over 80 per cent, respectively, of first marriages were dissolved. The lower figure for Guyana may be attributable to the fact that, of the two ethnic groups that constitute the population consensual and visiting unions are considerably more common in one than in the other. In both countries, when a union is dissolved, usually another is readily formed. Proportions of first marriages that have been dissolved are considerably lower in the remaining six countries, particularly those in Asia, excluding Indonesia. A very similar picture is seen of the relative numbers of ever-married women who have been married more than once. And there is some evidence that this frequency is related to traditions in respect to consensual and visiting unions; these union types are probably a counterpart of a high remarriage rate.

In the countries for which data are avaialble, a far greater proportion of first marriages are terminated by separation than by divorce or widowhood (table 3.4). This is because 1) mortality is comparatively low and, 2) a very large proportion of these marriages are consensual and termination is necessarily effected merely by separation. The wide prevalence of Catholicism is no doubt a factor in the uncommon occurrence of divorce.

3. Asia

In this region too, lack of availability of data of good quality seriously impairs knowledge of prevailing nuptiality conditions. The population census is the most substantial source of data, though some recent statistics are available from the WFS.

a. Age at marriage and proportion never married: analysis of census and *ad hoc* survey data

The singulate mean age of women at marriage varies widely among the countries of this region reflecting, among other things, the differences among them in culture and in such development indicators as the level of female education. Evidently, women of East Asia and Eastern South Asia marry at more advanced ages than do those elsewhere in the region (table 3.1).

The singulate mean age at first marriage varied from 19.3 in Indonesia (1970) and 20.3 in Sabah (1970) to 24.3 in Singapore (1970). Marriage occurs earliest in Middle and Western South Asia. On the Indian sub-continent, values are lowest, from 17.5 to 19.6, except in Sri Lanka for which a singulate mean of 23.5 was calculated from 1971 census returns. In both Hong Kong and the Republic of Korea in East Asia, a trend toward later age at marriage appears to have been underway for some time. Some movement in this direction has occurred also in the Middle South Asian countries, especially Pakistan for which the singulate means advanced from 16.7 to 19.6 during 1961-68. No change appears to have been registered in the Philippines and Thailand.

Little can be said of trends in the Arab countries of Western South Asia, as data are available for only two countries; singulate means of 24.8 and 20.7 for 1960 and 1970, respectively, suggest that Syrian women may have begun to marry earlier, whereas in Kuwait, there has been a slight change in the opposite direction. However, each of the non-Arab countries of the region has experienced an advancement in the age at which women marry. Throughout the region, marriage is virtually universal; in none of the countries represented in the table does the proportion never married aged 45-49 at the latest census exceed 6.7 per cent, and in most, the relative number is under 4 per cent.

These findings contrast with conditions in the economically more developed Japan where the singulate mean has remained at about age 25 for the last decade and a half (table 3.1). This stability is confirmed more or less by the median age of Japanese women at marriage, which varied only between 23.7 and 24.3 years from 1960 to 1977 (table 3.2).

In this region also, men marry at later ages than is customary for women. However, where trends could be examined, the gap in singulate mean age at marriage of the two sexes appears to have been narrowing, mainly because the age at marriage of females has risen more rapidly than that of males.

In Japan, a developed country, the difference has increased, and increasingly fewer proportions of males aged 20-24 years have married, while the relative number of females in this category has fluctuated upward.

Nuptiality conditions in the People's Republic of China are poorly documented. It is reported that females are not considered to be of marriageable age until they reach 23. 7/

b. Age at marriage and marital stability: results from the World Fertility Survey

Available evidence leads to the conclusion that, on the whole, women of this region enter their first marriage at an earlier age than is common among Latin American women. Among the nine countries for which data are available in table 3.3, mean age of females at first marriage varies from 12.5 in Bangladesh to 19.9 in the Republic of Korea. (The discrepancy between these data and the singulate means is due to the differences in methodology; the latter is based entirely on the population single at each age, whereas the means based on WFS data were derived from the actual age at which respondents reported that they married.) The data suggest that, with few exceptions, women in these countries are marrying at a later age than previously. The trend is strongest in Korea, a country that is experiencing a revolution of rising age at marriage, increasing contraceptive practice and declining fertility. Advancements in age at marriage may be deduced from the data for Indonesia, Korea, Pakistan, Sri Lanka, Malaysia and Fiji, where women aged 25-29 married on the average later in life than did the sample as a whole, the means for the samples are slightly above those for women aged 40-44 years. Women in Bangladesh have historically married extremely early (only 5 per cent were single at ages 20-24), and results of the survey reveals little change. Such change, if any, would be discernible from the differences in mean age at first marriage for the two cohorts for which figures are provided in table 3.3. It is fairly safe to conclude that the changes occurring in age at marriage are a part of the demographic revolution that now characterizes many Asian countries. On the other hand, it can be seen in these data that where cultural patterns sustain high fertility, health conditions permitting, they also foster early age at marriage.

7/ See Chen Muhua, "Birth planning in China", Family Planning Perspectives, vol. 11, No. 6 (November-December 1979), pp. 348-354. The legal age at marriage is given by Pi-chao Chen, who translated the article by Chen Muhua, who is a Vice-Premier of the People's Republic of China and Director of the State Council Birth Control Planning Leadership Group. The reference may be found in the translator's introduction.

Among the women in these national samples, the majority of first marriages remain intact. Dissolution, due mainly to divorce, was greatest in Indonesia. In that country 36 per cent of first marriages had been terminated. Prevalence of this phenomenon is next highest in Bangladesh (21.2 per cent) and Thailand (17.7). Except in Indonesia and Thailand, most marriages were dissolved by the death of spouse; among most Thai women (47.2 per cent) whose first marriage had terminated, the cause was attributed to separation. This factor also accounted for the disruption of 39.0 per cent of first marriages in Sri Lanka. But the relatively high rate of dissolution by divorce reflects not only social instability but also the evidently moderate level of male mortality.

Among the women whose first marriage had been terminated, high proportions remarried. Thus when the percentages of dissolved marriages and of remarriages are considered together, it is seen that, in those countries, very few once-married women spend large portions of their reproductive life outside of marriage.

The age of women at marriage and the proportions that ultimately marry prior to the end of their reproductive life have historically been among the more important variables capable of influencing fertility. In the populations in which desired family size is small and women are capable of achieving it through effective use of contraceptives, age at marriage has little bearing on completed fertility, although it may play a modest role in the fluctuations of crude birth and general fertility rates. Conversely, where the effective practice of fertility regulation is not yet diffuse, age at first marriage can be a determining factor in completed family size. In the populations of the latter type, which today are found almost exclusively in the economically less advanced countries, female celibacy is infrequent, as the value placed upon marriage and childbearing is very high and women have access to few other, if any, acceptable roles. Thus, most women marry. [8]

C. Developed countries

In recent years, a number of developed countries have been experiencing a revolution in respect to the incidence and timing of legal first marriages. The causes of this revolution are as yet unclear. However, it seems reasonable to hypothesize that responsible factors include the youth revolution, changes in the role and status of women and, not the least important, the radical changes that have occurred in the efficiency of contraceptives, the easier access to them and the far wider incidence of their use. The consequences include alterations of the relative personal satisfactions derived from marriage and family building; availability to women and men of alternatives to marriage bonds that, if not socially approved, at least do not incur social ostracism; the option that couples now have of cohabiting freely with considerably less susceptibility to an unwanted pregnancy. 9/ While these changes clearly are not to be found on any appreciable scale in every developed country, they are becoming increasingly apparent in growing numbers of them, especially in Western and Northern Europe. 10/

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[8] Marriage in this context refers to a legal or other socially accepted arrangement.

1. Proportions married

There are wide differences among the more developed countries in proportions ever-married at relatively early ages. In twelve of these for which data are provided in table 3.1, the censuses of around 1970 and later years recorded from 50 to 76 per cent of women aged 20-24 as never married, a datum of some significance in light of the fact that, in developed countries, this has long been one of the two age groups of peak fertility. Proportions of never married women within these ages were, on the whole, lowest in Eastern Europe, Northern America and Oceania, with values ranging from 24.1 (Romania) to 46.6 (Poland), though low values were recorded also for England and Wales (39.7) and Scotland (42.0). The highest percentages were reported for Northern and Southern Europe (excluding Yugoslavia) and for Japan, with a range of from 44.7 (Denmark) to 76.0 (Sweden).

Far greater proportions of males had not married at ages 20-24 than was the case with females. Of course, men typically marry at a later age than do women. At ages 25-29, however, from around 60 per cent to three-quarters had married, except in Japan, Ireland, Sweden, Greece, Italy and Spain. In all countries, except Canada, Sweden and Japan, later censuses enumerated higher proportions of ever-married males aged 25-29 years than were found in earlier censuses. In Sweden and Japan, there seems to have been a tendency for fewer men of these ages to have married. The picture for Canada is unclear, but a downward trend appears to have been slightly reversed.

It is only in Sweden among developed countries that there is a substantial trend of some duration that depicts a clear increase in proportions never-married among women aged 20-24 years; the relative numbers are 57.5, 60.0 and 76.0 in 1960, 1970 and 1975 respectively. A more recent inter-censal increase is notable for Canada, 1971-76 (43.5

9/ See, for a more thorough discussion, G.T. Acsádi and G.Johnson-Acsádi, "Recent trends and determinants of fertility in developed countries", in Social, Economic and Health Aspects of Low Fertility, A.A. Campbell, ed., United States Government Printing Office, Washington, D.C., 1980, pp. 1-29; L. Roussel and P. Festy, Recent Trends in Attitudes and Behaviour Affecting the Family in Council of Europe Member States, Council of Europe, Population Studies No. 4, (Strasbourg), 1979, pp. 20-27; and Council of Europe, Recent Demographic Development in Member States of the Council of Europe, Country Reports, 1979.

10/ L. Roussel and P. Festy, op. cit., pp. 42-43. E.M. Bernhardt and B. Holmbeck, "Fertility trends in Sweden", in J. Lindgren, ed., Yearbook of Population Research in Finland, 1973-1974, XIII, Helsinki, 1974.

and 45.3), and Australia, 1971-76 (35.8 and 40.1). Roussel and Festy's end of year figures for Denmark (1970 and 1975) and the Federal Republic of Germany (1970-75) show that in those countries, too, the change has been upward, from 45.4 to 62.4 in the former and 41.6 to 46.7 in the latter. Clearly, it is required to await the returns of post-1970 censuses or reports from population registers for supporting evidence of marital status changes considered to have occurred during the 1970's. Wherever post-1970 data can be observed, the evidence points to a spread of the phenomenon of delayed female marriages.

2. The incidence of marriage

Because of their susceptibility to the influence of the sex, age and marital status composition of the population, crude marriage rates are poor indicators of nuptiality trends. They usually do not vary markedly within short periods of time, unless there are very marked changes in the size of the cohorts of youth that represent the pool of marriageable persons. Recently, rising divorce rates and high rates of remarriage make it even more difficlut to interpret the crude rates. Certainly, international comparability of the crude marriage rate has been additionally affected. Moreover, the increased incidence of remarriage has lessened the influence of delayed first marriages on the annual crude rates. The crude marriage rates are useful, nevertheless, in that, even for the developed countries, they are frequently the only summary measures of nuptiality that are available on an annual basis.

Western Europe is experiencing a decline in the incidence of marriage (tables 3.5 and 3.6). The phenomenon is widespread and is associated with other significant changes that are taking place in the family. Among the fifteen members of the Council of Europe, for example, only Cyprus, Greece and Turkey failed to report declining nuptiality in 1978 and, in two of these countries, the incidence of marriage was reported as stable. 11/ Marriage rates were not provided for Turkey. England and Wales experienced a declining trend during the 1970's but it appears to have terminated, at least temporarily, in 1977. Apart from this, it may be said that, during the 1970's, the annual number of legally contracted marriages per 1000 of the population steadily declined in most countries of Northern and Western Europe. An erratic downward movement characterizes the rates for

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11/ Council of Europe, Recent Demographic Development in the Member States of the Council of Europe, Country Reports. (Cahed 42 (79) rev.), Strasbourg, 1979.

parts of Southern Europe and a slight rise is notable in Romania and the German Democratic Republic with stability prevailing elsewhere in Eastern Europe. Among developed countries outside of Europe the picture is also mixed; declines occurred in Japan, countries of Oceania and Canada, but in the United States and the USSR, the slightly higher rates recorded in the late 1960's persisted (tables 3.5 and 3.6). This contrasts with trends in developing countries, nearly all of which among those represented in the tables recorded increases in the crude marriage rate. However, as noted above, these changes may have been caused by changes in population composition. But this may also be due, as in England and Wales and in the United States to the high and rising remarriage rates which may have masked any drop in the incidence of first marriage that the crude marriage rate might otherwise have reflected. 12/

3. Age at marriage

The female inhabitants of the economically more advanced countries tend to marry at a later age although not uniformily so, than is common among women living in the less developed regions. Around 1970, the singulate mean age of females at marriage varied from slightly below 21 years in most countries of Eastern Europe to 25.7 in Sweden, but for most countries, this mean was between 21 and 22 years of age (table 3.1). It is of interest that, this differential between developed and developing regions is not evident in the case of males. With a few exceptions, men in developing regions marry at least as late as and in many countries much later than do those in developed countries. Indeed, among countries with data for a year around 1970, the statistics in table 1 show that, in 25 per cent of the developing nations, the singulate mean age of males at marriage is 27 or more years, but this is true for only 5 out of 28 or 17 per cent of the developed countries.

In the now developed countries, the secular trend in mean age of females at first marriage had been one of the precipitious downward movement at least from around 1900 to the end of the 1960's. It is well known that late marriage was a facet of the multi-phasic response to high fertility in these countries. 13/

12/ "Editorial", Population Trends 18 (London) Winter, 1979, p. 4; "Marrying, divorcing and living together in the United States today", Population Bulletin, Population Reference Bureau, Washington, vol. 32, No. 5, (Washington, 1977), pp. 4-5.

13/ K. Davis, "The theory of change and response in modern demographic history", Population Index, vol. 29, No. 4 (October 1963), pp. 345-366.

Information available from censuses or population registers around 1975 and later tend to confirm that a reversal of this secular trend in the age of females at marriage is finally underway. The singulate means provided in table 3.1 reveal this in only one or two countries, but these measures do not relate to dates sufficiently recent to enable observation of the phenomenon. For nearly all of the countries, the singulate means, which reflect behaviour over some years past, are declining or stable. The exception is Sweden, where advancement of age of women at first marriage apparently began some time ago, as there is a steady rise in the singulate mean from 22.5 years in 1960 to 25.7 in 1975.

Information on median age at first marriage provides a clearer picture of recent changes. The statstics in table 3.2 confirm that, in most of the developed countries, women have been marrying at increasingly advanced ages. Although the movement is slow, with an average change of only a few months yearly (which is a minority of cases may be statistically insignificant), the trend is unmistakably one of marriage at increasingly later ages. This tendency for women to marry at increasingly older ages is somewhat evident in some of the Eastern European countries but not in the German Democratic Republic for which the measures are stable and barely so, if at all, in Czechoslovakia. In the early 1970's the countries of this region introduced measures to make marriage more attractive and childrearing less burdensome, and these policies may have moderated a tendency for women to marry later. There are exceptions, too, in some countries of Southern Europe but, elsewhere in the developed region the trend appears to be toward an increasingly higher age of women at first marriage.

In conclusion, it may be said that both the decline in crude marriage rates, noted above, and the stability of period measures of median age of women at first marriage, notable in all European countries except those of Eastern Europe and in Sweden in which there is clearly a rise, point to a deceleration of the decline in age at marriage in some young cohorts and to a possible advancement in others. This view is supported by Roussel and Festy, 14/ who examined the marital behaviour of the 1930-31, 1940-41 and 1950-51 birth cohorts in several Western European countries, and, by others. 15/

4. Cohabitation among the unmarried

Perhaps the most striking phenomenon of nuptiality in the developed countries over the past decade has been the rapid spread, especially among young people, of the practice of consensual marriage. Both the frequency of marriage and age at marriage have been influenced in some countries by

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14/ *Op. cit.*, pp. 10-13.

15/ See, for example, E.M. Bernhardt and B. Holmbeck, *op. cit.*

these changing sexual norms. Surveys conducted in Denmark (1975), Sweden (1975), and France (1977), and among Swiss citizens married in Geneva (1974 and 1975), revealed that very large proportions of couples cohabited or lived together prior to legal marriage. 16/ Indeed, among Swedish women aged 20-24 years, a larger percentage was conabiting (unmarried) than was legally married, 28.6 and 21.5, respectively, and 37 per cent of women in this age group who had at least one child were in a consensual union. 17/

In France, the percentages of women in these ages, who were cohabiting and legally married were reported to be 12 and 49, per cent, respectively. Further, 60.7 per cent of the Swiss citizens married in Geneva in 1974 had lived together prior to formal marriage. Whether this pattern has emerged in other developed countries has not been established owing.to lack of data. It is claimed that such behaviour on the part of young couples has not achieved any thing like normalcy in European countries excluding some Scandanavian nations and one or two in Western Europe. 18/ Easy access to a variety of contraceptives and efficiency at birth control including abortion, is now a part of western culture. Childbearing is elective. Moreover, there is greatly increased social and individual acceptance of childbearing outside legal marriage. Hence, pre-marital pregnancy tends to necessitate marriage to a far lesser extent than formerly, and this fact tends to advance the age at marriage. But the high and rising frequency of cohabitation prior to marriage, or consensual marriage also advances the age at formal marriage. The practice among Swedish couples of living together for about two years prior to formal marriage is reported to have increased age of women at first marriage by two years over the last decade. 19/ Indeed, if the proportions in consensual unions are added to that in legal marriages, it will be seen from the 1975 census that only 50 per cent of Swedish women aged 20-24 were unmarried when that status is defined as not legally married and not in a consensual union. The proportion enumerated as never married among women in that age group amounted to 76 per cent at the 1975 census.

16/ For data and summary discussions, see L. Roussel and P. Festy, op. cit., pp. 27-29, 43; E. Hofsten, "Consensual unions and their recent increase in Sweden", Statistisk tidskrift, No. 1, 1978; and J. Trost, "Married and unmarried cohabitation; the case of Sweden, with some comparisons", Journal of Marriage and the Family, vol. 37, No. 3 (August 1975), pp. 677-682;

17/ E. Hofsten, op. cit., p. 30; L. Roussel and P. Festy, op. cit., p. 28.

18/ L. Roussel and P. Festy, op. cit., p. 28.

19/ Council of Europe, op. cit., p. 32.

The Council of Europe reported in 1979 that, in Iceland, consensual marriage, which had always been common, was on the increase and that, the 1977 Norwegian Fertility Survey revealed five per cent of all women 18 to 45 years of age and 12 per cent of those age 20-24 to be living in consensual unions. 20/ About one-quarter of women aged 20-29 years who are living in a union were reported in a 1973 survey to be cohabitants. 21/

In fact, after an analysis of marital status in Denmark, Spøhr wrote that, "in recent years cohabitation has become a widespread phenomenon in Denmark. So widespread that the value of registered information about the marital status of the population has become doubtful." 22/ Nor is this phenomenon confined to the developed countries of Europe. There were about 20 per cent more unmarried couples living together in the United States in 1970 than there were in 1960 and 83 per cent more in 1977 than in 1970.23/

The current structure of vital statistics reports and definitions of "married" in the population censuses of most countries do not permit an adequate assessment of the extent to which married life is begun consensually or legally or whether a change is underway. Hopefully, analysis of marital histories obtained in the survey taken as a part of the World Fertility Survey or in other, future surveys will improve our knowledge of this phenomenon.

5. Marriages by order of marriage

Most of the countries for which data are available have experienced decreasing first marriage rates for some time. Table 3.7 gives first marriage rates and remarriage rates for brides and grooms in selected countries since 1960. These figures point to a decline in first marriage rates for both brides and grooms in all of the countries represented, except France, Hungary and Portugal and excluding brides in the German Democratic Republic. In Scotland, too, the trend is moderately reversed in 1977 compared with 1976. But in the other three countries the rising frequency of first marriages is of much longer duration.

20/ Op. cit., p. 19, 20.

21/ H. Spøhr, "Problems of marital status", Fertility Decline in the Nordic Countries, The Scandanavian Demographic Society, Copenhagen, 1978, p. 124.

22/ Ibid., p. 117.

23/ "Marrying, divorcing and living together in the United States today", op. cit., p. 33.

Table 3.8 provides statistics of the number of first marriages per 1000 never married females by age (age specific first marriage rates) and age specific remarriages rates for selected countries. Table 3.9 gives similar statistics for males. The data show that when age and marital status are controlled, the incidence of marriage declined consistently in all age cohorts from 1965 onward in Sweden, Austria and the Federal Republic of Germany and beginning 1970 in Finland. In France, however, the decline persisted in the 15-19 and 45-49 age groups but, in 1975, was reversed among women aged 20-29 years. Yet another pattern is seen among Hungarian women; the incidence of first marriage dropped continuously from 1965 to 1975 among females in the 25-29 and 45-49 age groups, decreased after 1970 among women in the 20-24 age group and rose throughout 1965-75 among the 15-19 year olds.

The age patterns of male first marriage rates in most of these countries are very similar to those of females. Noteworthy exceptions are the rates for young Frenchmen aged 15-19 and 25-29 years. During the years 1965-75, these men entered first marriage with increasingly greater frequency. In Hungary, a post-1970 decline in the rates of first marriage is notable among men above the age of 19 years.

It is reported that England and Wales also witnessed a decline in first marriage rates during the years 1970 to 1977. 24/ Among members of both sexes who were under age 23, the decrease was marked, although declines were also registered for those aged 25-29 years. It has been estimated that, if current levels of remarriage persists, almost one out of every five men and women born around 1950 would enter a second marriage before reaching their fiftieth birthday. 25/

The United States has witnessed a continued decline in female and male first marriage rates since 1960 or earlier, and this has been most pronounced among young women in their early twenties. 26/ The rate for

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24/ "Editorial", Population Trends (United Kingdom), No. 18, (Winter 1979), p. 4.

25/ R. Leete, "New directions in family life", Population Trends 15, Office of Population Censuses and Surveys, London (Spring 1979), p. 9.

26/ "Marrying, divorcing, and living together in the United States today", Population Bulletin (Washington, D.C.) vol. 32, No. 5 (October 1977), p. 6.

women dropped 26 per cent during the years 1968-76 alone; for men, the decrease amounted to 28 per cent. 27/ The decline occurred at each age within the 18-29 bracket among both males and females, with negative changes of 42.9, 50.2 and 47.3 per cent among the women aged, respectively, 20, 21 and 22 years. 28/

These changes in first marriage rates noted above are clear evidence, in the absences of direct statistical proof, that the age at which women in these countries first marry has been advancing, though the movement has not as yet been reflected in the census returns on proportions of people who remain single at specified ages (however, it will necessarily be seen in data from censuses taken in and around 1980). The fact that crude marriage rates reveal relatively little of this is not surprising since, in some countries remarriage rates are very high, if declining, among certain age groups of both sexes (tables 3.8 and 3.9). In addition to the countries represented in tables 3.7, 3.8 and 3.9, very high rates of remarriage have been recorded over the last decade also in the United States. Thirty-one per cent of marriages contracted in 1976 were the bride's second marriage; the comparable figure for grooms was 32.7. In 1969, the respective figures were 23.1 and 23.2. 29/

Men remarry far more frequently than do women and, in the countries for which data are available, the trend is, with few exceptions, downward for both sexes. In addition to the countries mentioned above, a decline in remarriage has been occurring among both sexes also in Canada. 30/ Just as the incidence of first marriage is increasing in Portugal and France, so are the rates or remarriage, but this is not true in Hungary - which also had rising rates of first marriage - as a decrease, sharper among men than among women, is clearly underway.

In summary, it must be said that marriage patterns and trends in the developed countries are highly complex. That a change involving far more than the postponement of marriage is underway is hardly debatable. Something akin to a re-

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27/ "First marriages, United States, 1968-1976", Vital and Health Statistics, Series 21, Number 35 (September 1979), pp. 7-8.

28/ Ibid., p. 11.

29/ "First marriage, United States, 1968-1976", Vital and Health Statistics, Series 21, No. 35 (September 1979), p. 2.

30/ Statistics Canada, 1971 Census of Canada, Profile Studies - Marital Status and Nuptiality in Canada, Vol. V (Part 1), Ottawa, May 1978, pp. 53-54.

volution of attitudes and behaviour with respect to marriage and the family now characterize many of the developed countries. Women are marrying at a later age, but the entry into formal marriage is being preceeded increasingly by a period of consensual marriage into which women enter at ages below the median age at which they entered legal marriage only a few years ago. Surely this is reflected in the report that, in 1975, 18 per cent of 18-19 year old Swedish women were in a union and 87 per cent of those were in a consensual marriage. 31/ Thus, it is hardly correct to say simply that age at marriage is being advanced when, in fact, age at first union formation has continued the secular decline. It is that the institution of marriage and attitudes toward it are changing and that the institutional framework has been altered.

With freedom from involuntary parenthood owing to improved contraceptive technology and relaxed laws relative to abortion, there is less need for marriage forced by premarital pregnancies; indeed, with the changing mores, in a few countries, motherhood without formal marriage does not carry a stigma. Childbearing in consensual unions is becoming increasingly common. Just as formal marriage appears to be less popular, so is childbearing. Both seem to have been given impetus by the women's movement which was very strong in the early 1970's. But that movement was preceeded by one in which youth rebelled and a great number rejected life in their parental home, so that, for many parents, the rewards of childbearing were lost. All of this points to a change in the family itself as the central factor in the recent alteration of marrying trends.

31/ E. Hofsten, op. cit., pp. 28-29.

Chapter 4

MORTALITY

After many years of relative neglect, attention within the demographic community is again being focussed on mortality and the role of mortality in demographic, economic and social processes. Concern about recent mortality levels and changes has been most acute in the developing world where life expectancy at birth is currently only around 55 years for the developing regions as a whole and considerably less for certain countries. In comparison, life expectancy in the developed regions is estimated to be over 70 years at birth, and as high as 75 years for individual countries.

Mortality data are generally most scarce and unreliable for those populations, all in the developing regions, which have the highest mortality and where concern is therefore the greatest. The large differentials between developing and developed countries both in availability and quality of data as well as in actual mortality levels necessitate different types of analyses and therefore separate treatment.

A. Developing countries

Patterns of mortality can be measured on a regular basis only in countries with high quality vital registration systems or continuous on-going surveys. The lack of such mechanisms in many less developed countries continues to hinder monitoring of mortality trends. Even in countries with reliable data collection systems, specific measures of mortality, such as life expectancy at birth, can often only be calculated on a decennial basis because the information on the age-structure of the population necessary for calculation of age-specific rates is unavailable except during census years.

The forthcoming United Nations volume entitled Levels and Trends of Mortality Since 1950 1/ has brought together recent information on mortality patterns in the developing (and developed) world. Much of the information in this volume was summarized in

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1/ Levels and Trends in Mortality Since 1950 (United Nations publication, forthcoming).

volume 1 of the 1979 Report on Monitoring of Population Trends 2/ and rather than repeat this summary here only a brief description is presented of relatively current (1970 or later) mortality levels in countries for which reliable estimates have been made as well as of the most recent trends in 23 developing countries with complete death registration systems. Moreover, considerably expanded sections are presented below on age and sex patterns of mortality and a later chapter presents a discussion of mortality differentials.

1. Recent levels and trends of mortality in selected less developed countries

Because of problems of timeliness and data quality it is not now possible to present annual estimates of levels and trends of mortality during the 1970s for all less developed countries. Therefore the following sub-sections present the most current estimates (1970 or later) of mortality (crude death rate, life expectancy at birth, and infant mortality rate) only for those developing countries for which relatively reliable figures are available to the United Nations; and, for a smaller set of countries with nearly complete death statistics, this study will present estimates of mortality trends. Levels and trends of mortality in these countries may not be indicative of those in countries for which reliable figures were not available. In fact even among a few of the countries for which data are presented here, agreement is not universal as to the current mortality situation.

(a) Recent levels of mortality

Table 4.1 presents the crude death rate, life expectancy at birth and infant mortality rate for less developed countries with relatively reliable estimates. Although there is considerable overlap among the regions, countries with the lowest mortality are generally found in East Asia and Latin America, while those with the highest mortality are found in the South Asian region and the African region. Not presented in the table but of considerable

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2/ World Population Trends and Policies: 1979 Monitoring Report, Vol. I (United Nations publication, Sales No. E.79.XIII.4).

Table 4.1 Crude death rates, life expectancy at birth, and infant mortality rates for selected less developed countries with relatively reliable estimates, latest available data since 1970.

Region and country	Year	Crude death rates (Deaths for 1,000 population)	Year	Life expectancy at birth	Year	Infant mortality rates (Infant deaths for 1,000 live births)
Africa						
Eastern Africa						
Ethiopia	1964-1970	20-26	1964-1970	36-44	1964-1970	155-200
Kenya	1977	14	1977	53	1977	83
Malawi	1971-1972	27-28	...	...	...	...
Mauritius	1978	7*	1971-1973	63	1978	34*
Reunion	1977	6	...	...	1977	18*
United Republic of Tanzania	1973	16-18	1973	45-49	1973	120-130
Middle Africa						
United Republic of Cameroon	1976	20	1976	44	1976	157
Northern Africa						
Algeria	1977	14	1977	55	1977	127
Egypt	1978	11*	...	...	1975	90
Morocco	1972	15	1972	51	1972	162
Sudan	1973	19	1968-1973	45	1968-1973	141
Tunisia	1978	8*	...	...	...	...
Southern Africa						
South Africa	1970	13	1965-1970	57	1970	93-101
Western Africa						
Ghana	1970	17	1970	49	1970	115
Nigeria	1970-1973	21	1970-1973	41	...	...
Senegal	1970-1971	20-22	...	...	...	...
Latin America						
Caribbean						
Cuba	1978	6*	1970	70	1977	25
Dominican Republic	1965-1970	13	1965-1970	55	1965-1970	96

Table 4.1 (continued)

Region and country	Year	Crude death rates (Deaths for 1,000 population)	Year	Life expectancy at birth	Year	Infant mortality rates (Infant deaths for 1,000 live births)
Latin America						
Caribbean (continued)						
Guadeloupe	1978	6*	....		1978	21
Haiti	1965-1970	19	1965-1970	46	1965-1970	150
Jamaica	1978	6*	1970	67	1976	20*
Martinique	1978	7*	...	...	1977	19*
Puerto Rico	1978	6	1971-1973	72	1977	20
Trinidad and Tobago	1978	6	1975	67	1978	29*
Middle America						
Costa Rica	1977	4	1972-1974	69	1977	28
El Salvador	1970-1972	12	1969-1971	57	1969-1971	105
Guatemala	1975	13	1970-1972	53	1976	76
Honduras	1973-1975	15	1973-1975	52	1973-1975	127
Mexico	1978	6*	1969-1971	61	1972-1974	70
Temperate South America						
Argentina	1977	9	1969-1970	66	1977	45
Chile	1975	7*	1969-1971	62	1975	61
Uruguay	1976	10	1975	69	1976	46
Tropical South America						
Bolivia	1976	20	1975	47	1975	168
Brazil	1974-1975	9	1974-1975	60	1974-1975	84
Colombia	1973	9	1973	59	1973	77
Ecuador	1965-1970	14	1965-1970	61	1965-1970	115
Guyana	1978	7*	...	...	...	...
Peru	1975	13	1969-1971	55	1969-1971	141
Venezuela	1977	6	1971	65	1975-1977	45
East Asia						
Other East Asia						
Hong Kong	1978	5*	1976	73	1978	12*
Korea						
Republic of Korea	1971-1975	8	1971-1975	63	1971-1975	38
South Asia						
Eastern South Asia						
Indonesia	1975	16	1975	46	1975	114
Malaysia						
Peninsular Malaysia	1976	6	...	...	1977	32

Table 4.1 (continued)

Region and country	Year	Crude death rates (Deaths for 1,000 population)	Year	Life expectancy at birth	Year	Infant mortality rates (Infant deaths for 1,000 live births)
Asia (continued)						
Philippines	1970	11	1969-1971	61	1969-1971	62
Singapore	1978	5*	1969-1971	69	1978	12*
Thailand	1974-1975	8-10	1969-1971	59	1969-1971	62
Middle South Asia						
Afghanistan	1972-1973	28-32	1972-1973	35-39	1972-1973	217-235
Bangladesh	1974	20	1969-1974	46	1969-1974	153
India	1970-1972	16	1970-1972	47	1970-1972	122
Iran	1973-1976	12	1973-1976	57	1973-1976	125
Nepal	1975	21	1974-1976	43	1974-1976	133
Pakistan	1972	18	...	...	1971	142
Sri Lanka	1978	7	1970-1972	64	1974	53
Western South Asia						
Arab Countries						
Kuwait	1977	5	1974-1976	68	1977	39
Non-Arab Countries						
Israel	1978	7	1971-1973	72	1977	18
Turkey	1975	12	1974-1975	57	1974-1975	125

Source: Compiled by the United Nations Population Division from various sources.

... Data not available.
* Provisional.

importance because of its very large population size is the People's Republic of China. Chinese data are still of unknown reliability. However, life expectancy at birth has recently been estimated as 68 years. 3/

With a few exceptions, the gap between mortality levels in the developing and developed countries remains large. 4/ In the mid-1970s 26 of 31 developed countries had life expectancies at birth of 70 years or greater, whereas only 4 of the 56 developing countries had similarly high life expectancies. With respect to infant mortality, 27 of the 31 developed countries, but only 11 of the 56 developing countries, have infant mortality rates under 30 per thousand live births. With regard to the crude death rate, both the lowest and highest rates fall in the developing regions. This is to be expected since the crude death rate reflects not only mortality but also the underlying age structure of the population. The youthful population of the developing countries interacts with age-specific death rates to depress the crude death rates so that, for example, Mexico has a lower crude death rate than the United Kingdom even though the Mexican infant mortality rate is higher and life expectancy at birth is lower.

What is most evident from this compilation of mortality figures is the wide disparity of mortality levels not only between developing and developed countries but also among the developing countries. Since the governments of all countries wish for high levels of health and low levels of mortality for their populations, these disparities reflect at least in part the differential success of countries in implementing mortality reduction policies as well as the still incomplete understanding of the interractions between health and mortality patterns with the various individual, community and environmental factors which affect them.

(b) Recent trends of mortality

Trends in mortality are described for 23 of the above developing countries having populations of 300,000 or more and death registrations systems with 90 percent or better coverage as indicated in publications

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3/ United Nations, Levels and Trends in Mortality Since 1950, op. cit.

4/ For developed country data, see tables 4.7 and 4.9 in section B.

of the United Nations Statistical Office. 5/ Of these 23 countries, 3 are in Africa, 14 are in Latin America, and 6 are in Asia. The countries are generally not typical of their regions, as with few exceptions they are countries of relatively low mortality. Therefore the results of this analysis may not be generalizable to the developing world as a whole. Two age-specific mortality measures are considered. The first is the infant mortality rate. The second is the geometric mean of 5-year age-specific death rates for ages 15-74. This second measure is an index of adult mortality. 6/ Measures have been calculated for dates around 1950, 1965, 1970 and 1975 as well as for the most recent date in which the requisite data are available. The measures are based solely on registration data, without adjustments for coverage errors. Even among these countries, however, there is still some underregistration of deaths, especially among infants, and because the interest here is in trends, not levels (see table 4.1 for estimates of mortality levels in these and other countries), the measures have been converted to index numbers with a base value of 100.0 at the date closest to 1950. Tables 4.2 and 4.3 present respectively the indices of infant and adult mortality along with average annual percent changes. It is important to note that although the index of infant mortality is generally available for very recent time periods, this is not always true for the index of adult mortality. This is because infant mortality rates are calculated solely from vital registration data whereas calculation of the index of adult mortality requires knowledge of the underlying population age structure, information generally only available from a census. For many countries the last census was taken during the 1970 round so the

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5/ For quality codes, see United Nations, Department of International Economic and Social Affairs, Demographic Yearbook 1978 (New York, 1979), table 18, pp. 316-320. The data itself are from the forthcoming Historical Supplement of the Yearbook.

6/ The use of the geometric mean of age-specific death rates as a concise measure of mortality was first suggested by Schoen. The measure has many desirable features including ease of calculation and homogeneity (to degree one), that is a change of p percent in each death rate will be summarized as a change of p percent in the measure itself. See R. Schoen, "The geometric mean of the age-specific death rates as a summary index of mortality," Demography, 1970, vol. 7, no. 3, pp. 317-324.

Table 4.2 Index of infant mortality and average annual percent change therein for 23 developing countries with relatively complete death registration

Country	Index					Average Annual Percent Change[a]			
	1949-51	1964-66	1969-71	1974-76	Latest	1949-51 to 1964-66	1964-66 to 1969-71	1969-71 to 1974-76	1974-76 to Latest
Africa									
Eastern Africa									
Mauritius	100	74	71	54	40 (1979)	- 2.0	- 0.7	- 5.6	- 6.7
Reunion	100	47	32	16	10 (1979)	- 4.9	- 7.5	-12.9	-11.4
Northern Africa									
Egypt	100	90	86	77 (1974)	64 (1977)	- 0.7	- 1.0	- 2.7	- 5.9
Latin America									
Caribbean									
Cuba	100 (1949)	100	108	68	58 (1978)	0.0	+ 1.5	- 8.7	- 1.9
Guadeloupe	100	59	59	45 (1974)	30 (1978)	- 3.4	0.0	- 6.7	- 9.2
Jamaica	100 (1949-50)	46	39	31	20 (1978)	- 5.0	- 3.5	- 4.2	-13.8
Martinique	100	55	48	43 (1974)	22 (1976)	- 4.0	- 2.7	- 2.3	-15.9
Puerto Rico	100	66	43	31	30 (1977)	- 2.7	- 8.0	- 6.2	- 2.4
Trinidad and Tobago	100	48	44	33	30 (1978)	- 4.8	- 1.6	- 5.8	- 2.6
Middle America									
Costa Rica	100	87	68	40	31 (1977)	- 0.9	- 4.7	-10.3	-11.8
El Salvador	100	77	71	65	59 (1978)	- 1.7	- 1.5	- 1.6	- 3.1
Guatemala	100	88	85	76	68 (1978)	- 0.9	- 0.7	- 2.2	- 4.0
Mexico	100	63	67	51	60 (1978)	- 3.0	+ 1.2	- 5.3	+ 5.6
Temperate South America									
Argentina	100	82	49 (1970)	...	...	- 1.2	- 2.6	...	...
Chile	100	76	56	42	28 (1978)	- 1.7	- 5.9	- 5.8	-12.7
Uruguay	100	81	88	84	81 (1976)	- 1.4	+ 1.7	- 0.8	- 4.2
Tropical South America									
Guyana	100	60	51	...	...	- 3.3	- 3.1	...	...
East Asia									
Hong Kong	100	25	20	15	13 (1979)	- [illegible]	- 4.5	- [illegible]	- 7.2
South Asia									
Peninsular Malaysia	100	53	44	34	32 (1977)	- 4.1	- 3.5	- 4.8	- 3.1
Singapore	100	36	26	18	17 (1978)	- 6.6	- 5.8	- 6.9	- 2.4
Sri Lanka	100	65	54 (1972)	...	50 (1976)	- 2.7	- 2.7	- 1.4[a]	
Kuwait	...	100	66	91	91 (1977)	...	- 2.9	+ 1.0	0.0
Israel	100	57	51	47	32 (1978)	- 3.6	- 2.3	- 1.7	- 9.5

... Data not available.

Source: Based on registered infant mortality rates presented in the United Nations Historical-Supplement to the 1978 Demographic Yearbook (forthcoming), table 1; and United Nations, Population and Vital Statistics Report, 1 April 1960.

a/ If the index for a given country pertains to years other than those indicated in the index column headings (these years appear in parentheses), the percentage change relates to the period bracketed by those years.

Table 4.3 Index of adult mortality and average annual percent change therein for 23 developing countries with relatively complete death registration

Country	Index					Average Annual Percent Change a/			
	1950	1965	1970	1975	Latest	1950 to 1965	1965 to 1970	1970 to 1975	1975 to Latest
Africa									
Eastern Africa									
Mauritius	100	48	46	50	48 (1977)	- 5.5	- 1.0	+ 1.6	- 1.2
Reunion	100	84 (1964)	78 (1967)	...	...	- 1.7	- 2.4	...	...
Northern Africa									
Egypt	...	...	...	...	...	...	...	...	...
Latin America									
Caribbean									
Cuba	...	100	92	...	...	...	- 1.6	...	...
Guadeloupe	100	59 (1964)	69 (1967)	...	...	- 5.1	+ 5.0	...	...
Jamaica	100	57	55	...	...	- 3.6	- 0.8	...	...
Martinique	100 (1954)	69	64 (1967)	...	...	- 3.3	- 4.1	...	...
Puerto Rico	100	50	51	...	...	- 4.5	+ 0.3	...	...
Trinidad and Tobago	100	53	53	47	...	- 4.1	- 0.2	- 2.4	...
Middle America									
Costa Rica	100	58 (1964)	...	48 (1973)	...	- 3.8	- 2.1	...	...
El Salvador	100	72 (1961)	56 (1971)	...	...	- 3.0	- 2.4	...	...
Guatemala	...	100 (1964)	96 (1970)	...	...	...	- 0.6	...	...
Mexico	100	63	62	55	...	- 3.0	- 0.4	- 2.6	...
Temperate South America									
Argentina	100 (1960)	89 (1966)	...	...	66 (1977)	- 1.9	- 0.3	...	...
Chile	100 (1952)	...	63 (1971)	...	52 (1976)	...	- 2.4	- 3.8	...
Uruguay	...	100 (1963)	93 (1968)	90	...	...	- 1.5	- 0.5	...
Tropical South America									
Guyana	100 (1952)	73 (1960)	53 (1970)	...	...	- 3.9	- 3.1	...	...
East Asia									
Hong Kong	100 (1961)	76	89	70	68 (1977)	- 6.5	+ 3.2	- 4.8	- 1.5
South Asia									
Peninsular Malaysia	100 (1957)	58 (1966)	52 (1970)	52 (1975)	50 (1976)	- 5.9	- 2.6	+ 0.1	- 4.3
Singapore	100 (1957)	69 (1967)	68	61	56 (1977)	- 3.6	- 0.8	- 1.9	- 2.4
Sri Lanka	100 (1955)	89 (1963)	84 (1968)	...	...	- 1.4	- 1.2	...	...
Kuwait	...	...	100	106	102 (1976)	...	...	+ 2.6	- 4.1
Israel	100 (1955)	95	98	93	84 (1977)	- 0.5	+ 0.7	- 1.1	- 4.6

... Data not available.

Source: Based on age-specific death rates presented in the United Nations Historical Supplement to the 1978 Demographic Yearbook (forthcoming), table 10.

a/ If the index for a given country pertains to years other than those indicated in the index column headings (these years appear in parentheses), the percentage change relates to the period bracketed by those years.

most recent data are presently about 10 years old.

From table 4.2 it can be seen that infant mortality in nearly all of the included countries has been steadily declining since 1950 and generally is declining faster now than previously. Nevertheless in about one-half of these countries there is a slight irregularity in the curve, around the 1965-70 period, indicating a temporary slowing down (or in a few cases, an actual retrogression) of the pace of infant mortality decline followed by a resumption of the earlier more rapid decline. Simple unweighted averages of the average annual percent changes of infant mortality between periods adequately demonstrate this pattern of mortality change. The "typical" country experienced an infant mortality decline of 3.1 percent per year from 1949-51 to 1964-66, 2.6 percent from 1964-66 to 1969-71, 4.7 percent from 1969-71 to 1974-76 and 6.1 percent from 1974-76 to the latest available date.

Whether similar patterns of mortality decline are occurring during the adult years is less clear because of the sparsity of the data. However, as seen from table 4.3 overall declines in adult mortality have occurred in every country but Kuwait, and the Kuwaiti data may largely reflect the improving system for registration of deaths. And in each of 7 countries in which available data allowed a computation of the pace of adult mortality decline at 3 points in time an irregularity similar to that of infant mortality occurred during the late 1960s or early 1970s. Taking simple averages as done for infant mortality above, adult mortality declined 3.6 percent annually from 1950 to 1965, 0.9 percent from 1965 to 1970, 1.3 percent from 1970 to 1975 and 3.0 percent from 1975 to the most recently available date.

It seems not to have been uncommon, therefore, both among infants and adults, for there to have been a small slowing of the pace of mortality decline during the 1965-70 period. However this slowing has in most cases been temporary and the pace of mortality decline increased again sometime during the 1970s. It must be emphasized however that the countries studied here are a select group that have already attained quite low levels of mortality and the paths of mortality decline presented here may not be representative of the larger group of less developed countries. Without the requisite registration or survey data, the extent of mortality change during the 1970s in most developing countries remains speculative.

2. Mortality patterns by age and sex

As part of a United Nations project to produce a new set of model life tables, 36 male and female life tables for 22 developing countries were constructed and analyses made of their age and sex patterns of mortality. 7/ Table 4.4 presents a list of these countries and their life expectancies at birth and at age 10. Although these countries are not fully representative of the less developed world, they do provide a reliable set of life tables from which observed age and sex patterns of mortality are likely to represent actual patterns rather than errors in the data. Four distinct age patterns and 3 patterns of sex differentials were identified, conforming approximately to geo-cultural boundaries.

(a) Age patterns of mortality

The four age patterns have been tentatively labelled: the Latin American pattern, the Far Eastern pattern, the South Asian pattern and the Chilean pattern. Preliminary mortality models have been developed for each of these patterns. Figures 4.1 and 4.2 present graphically these four age patterns of mortality by presenting the rations $\frac{q_x}{q_x^s}$ as a function of age x, where q_x is the mortality rate at age x for the given model and q_x^s is the mortality rate at age x in the Coale and Demeny West region life table 8/ with the same expectation of life at age 10. The graphs show the ratios for life expectancies at birth of 40, 55 and 70 years.

The first model, designated the Latin American pattern, is based on the life tables of Colombia, Costa Rica, El Salvador, Guatemala, Honduras, Mexico and Peru, as well as the non-American countries of the Philippines, Sri Lanka and Thailand which were shown by statistical and graphical procedures to have similar patterns of mortality. Compared to historical Western European experience, as described by the Coale-Demeny West region, this pattern shows high

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7/ All available data on levels and age-sex patterns of mortality in countries of the developing world were evaluated and analyzed. For countries with high quality death and population data and for countries with poorer data but for which reliable adjustments could be made, life tables were constructed. These life tables serve as the base life tables for the model life table project.

8/ A. Coale and P. Demeny, Regional Model Life Tables and Stable Populations, (Princeton University Press, Princeton, 1966).

Table 4.4 Life tables constructed for the United Nations model life table project

Country	Year	Male Life Expectancy at		Female Life Expectancy at	
		Birth	Age 10	Birth	Age 10
Africa					
Tunisia	1968-69	52.7	56.4	52.5	56.7
Latin America					
Caribbean:					
Trinidad and Tobago	1920-22	37.6	40.1	40.1	42.6
	1945-47	53.0	50.2	55.8	52.4
	1959-61	62.4	57.0	66.6	60.5
Middle America:					
Costa Rica	1962-64	60.9	59.7	63.7	61.6
	1972-74	67.5	62.6	71.2	65.7
El Salvador	1970-72	54.9	57.7	60.1	62.4
Guatemala	1963-65	46.8	50.5	48.0	51.6
Honduras	1960-62	40.6	46.7	44.1	49.4
	1973-75	50.1	52.9	54.3	56.3
Mexico	1969-71	58.8	57.5	62.9	61.2
Temperate South America:					
Chile	1951-53	51.6	52.0	55.6	55.7
	1959-61	54.7	54.7	60.1	59.8
	1969-71	58.9	55.4	64.9	61.1
Tropical South America:					
Colombia	1963-65	57.7	55.6	59.7	58.3
Guyana	1959-61	59.5	55.1	63.7	58.8
Peru	1969-71	53.3	58.8	57.3	62.5
East Asia					
Other East Asia:					
Hong Kong	1960-62	63.7	57.8	71.1	65.2
	1970-72	67.6	59.7	75.2	66.9
	1976	69.6	61.1	76.6	67.9
Korea, Republic of	1971-75	59.3	52.8	66.1	60.0
South Asia					
Eastern South Asia:					
Philippines	1969-71	58.7	56.4	64.0	61.0
Singapore	1969-71	65.9	57.9	72.2	64.0
Thailand	1969-71	56.5	54.4	60.8	57.9

.../...

Table 4.4 Life tables constructed for the United Nations model life table project (continue)

Country	Year	Male Life Expectancy at		Female Life Expectancy	
		Birth	Age 10	Birth	Age 10
Middle South Asia:					
Matlab (Bangladesh)	1974 and 1976 (average)	52.6	56.1	52.8	56.4
India	1970-72	49.1	53.3	46.2	51.9
Iran	1973-76	57.2	59.5	56.6	60.8
Sri Lanka	1945-47	44.8	48.5	43.1	46.8
	1952-54	58.4	58.6	57.3	57.4
	1962-64	62.1	59.7	62.6	59.9
	1970-72	63.8	59.4	66.7	62.2
Western South Asia:					
Arab countries					
Kuwait	1974-76	65.9	60.2	70.3	64.4
Non-Arab countries					
Israel					
Jewish population	1948-49	65.1	60.5	67.6	62.2
	1960-62	70.8	63.4	72.6	64.9
	1971-73	70.5	62.4	73.5	65.0
Non-Jewish population	1971-73	66.6	60.4	69.9	63.2

Figure 4.1 Deviations of developing country patterns from Coale-Demeny West Region (males)

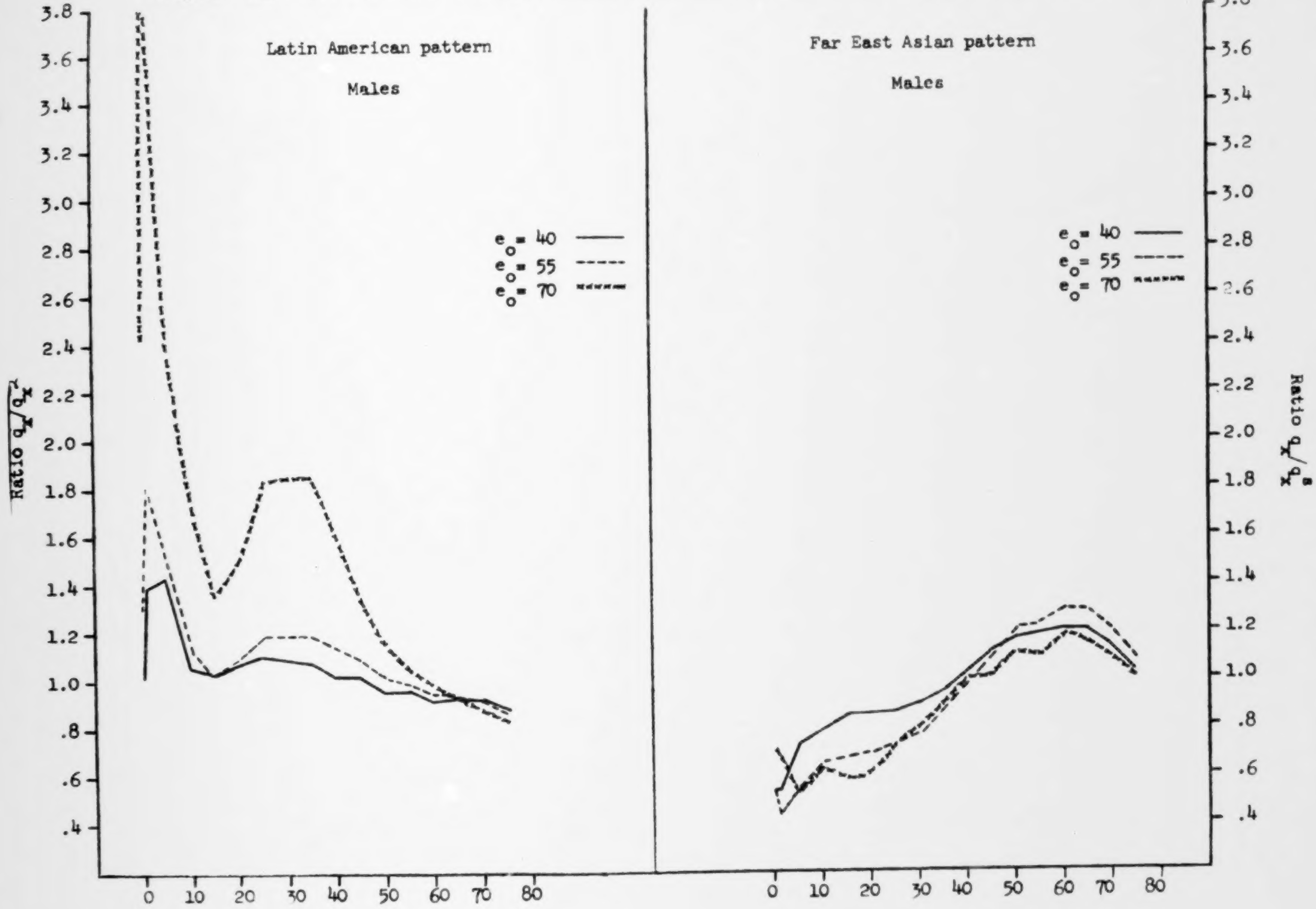
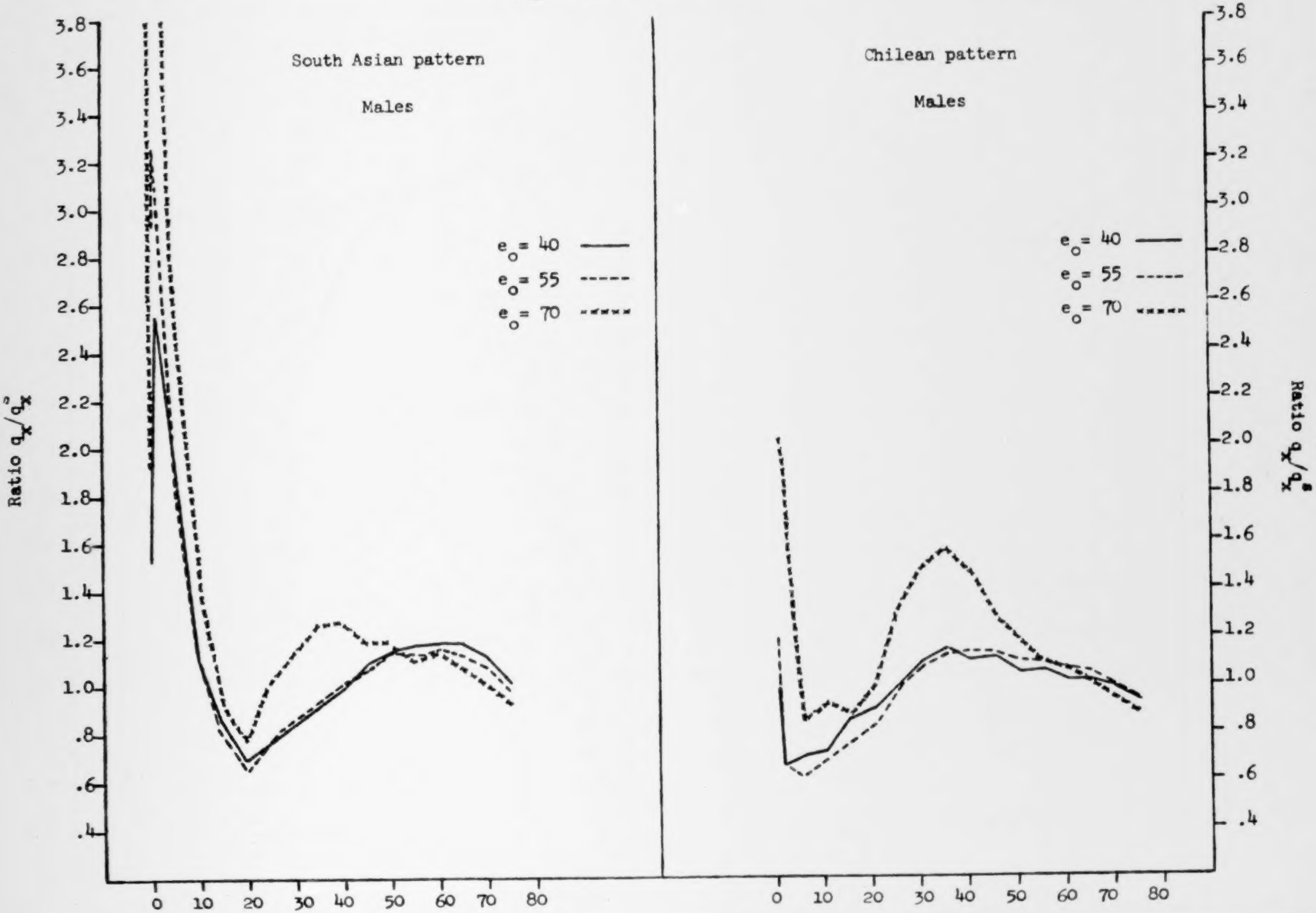


Figure 4.1 (continued)



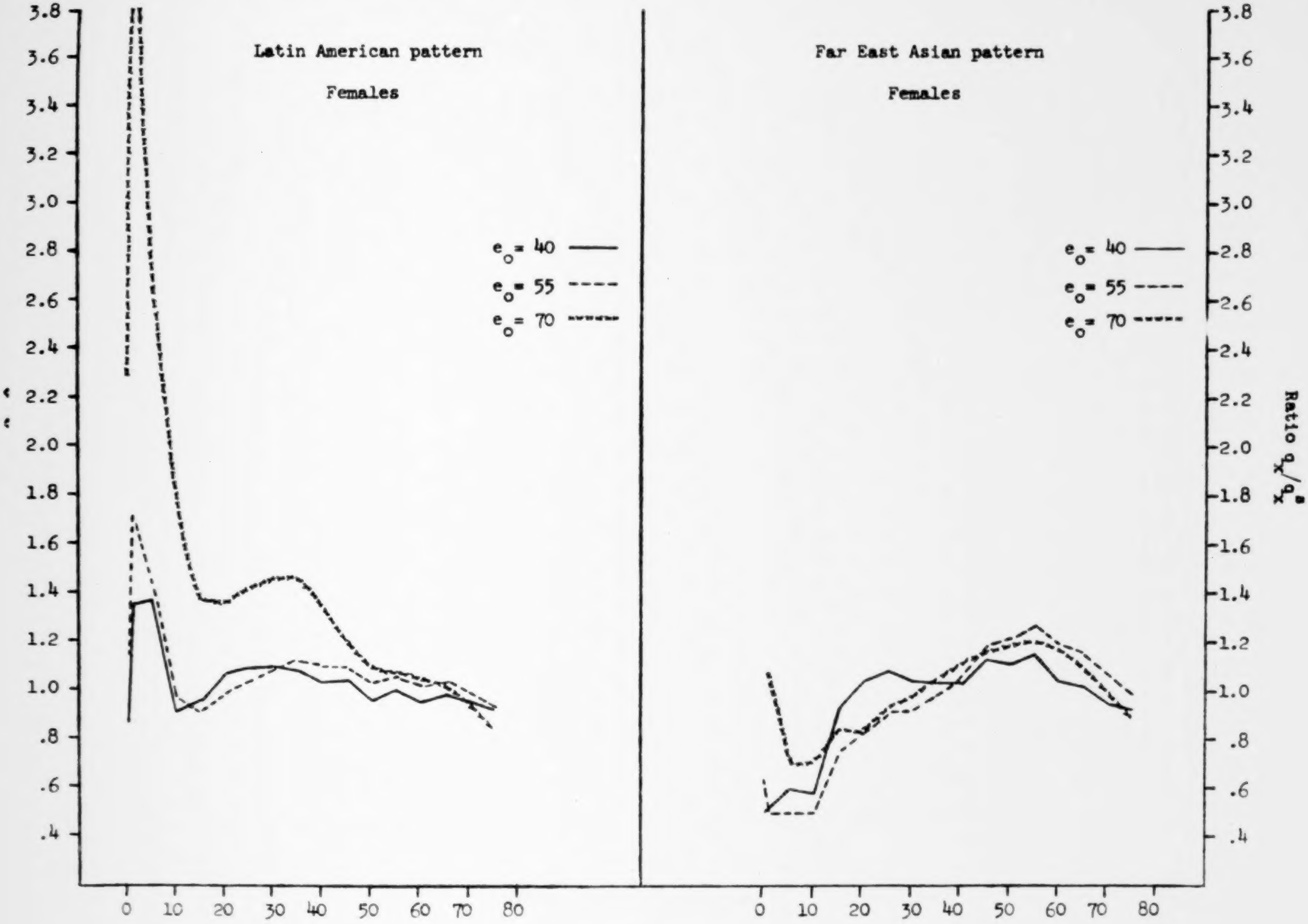
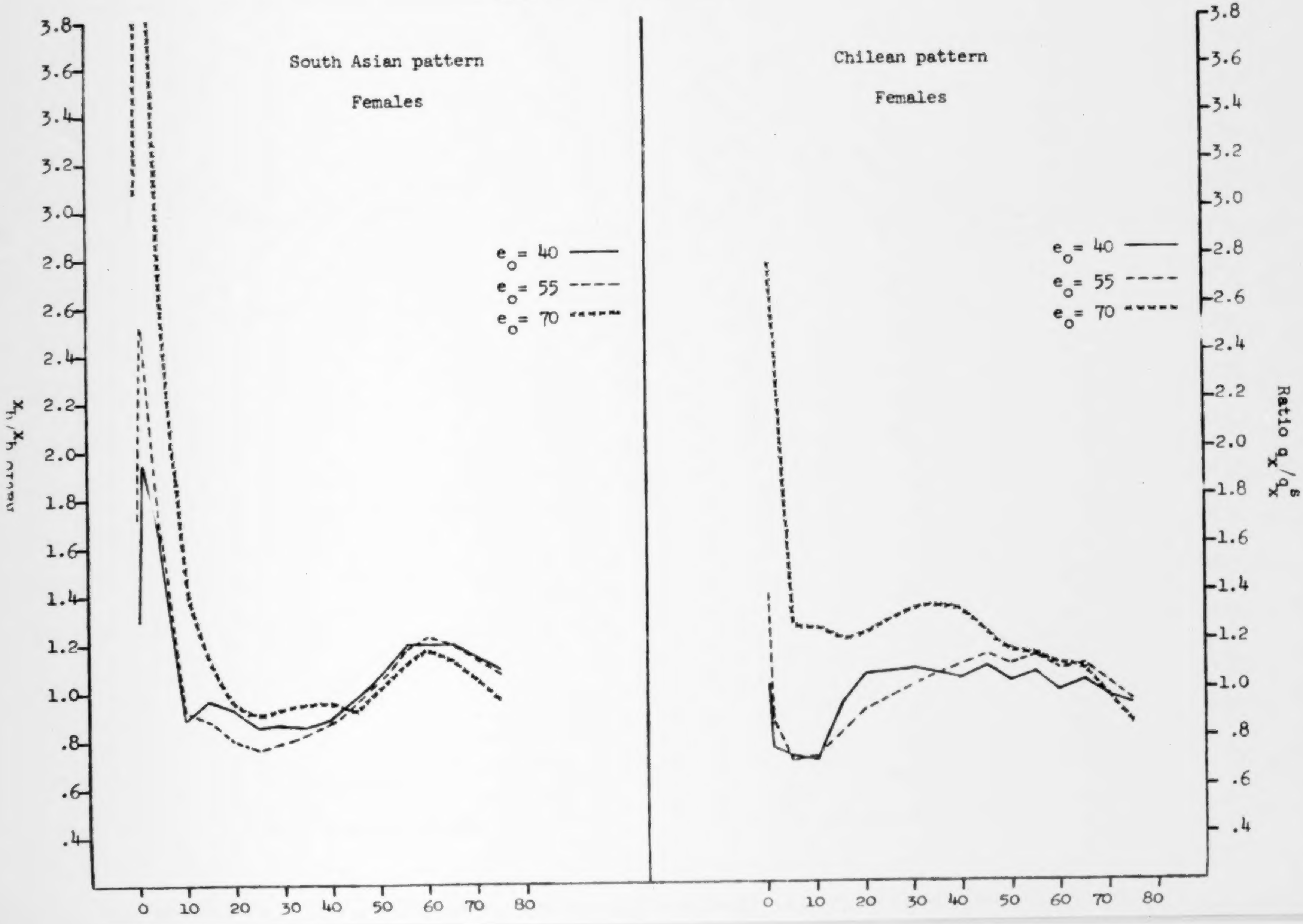


Figure 4.2. Deviations of developing country patterns from Coale-Demeny West Region (females)

Figure 4.2 (continued)



mortality during the infant and childhood years, high mortality again during young adult years and relatively low mortality during the older years. These deviations are rather small when mortality is high but increase as mortality declines, presumably reflecting the growing importance relative to Western European experience of diarrhoeal and parasitic diseases during childhood and accidental deaths (mainly motor vehicle) during the prime ages, and the relatively low levels of cardiovascular diseases at the older ages.[9]

Since the model life table project only included countries for which data could be reliably evaluated and if necessary corrected, mortality data from the two largest and most populous countries in South America, namely, Brazil and Argentina, were excluded from the sample. This is unfortunate as these two countries comprise over 40 per cent of the population of the Latin American region. Life tables are available for Brazil based on intercensal survival analysis and indirect questions on early-age mortality, and for Argentina based on civil registration and census data. [10] Death registration in Argentina is generally considered to be reliable for the adult ages but is of unknown completeness for deaths at the earliest ages. 11/ Analysis of the Brazilian data show its age pattern of mortality to be similar to that of the Latin America model. The pattern for the Argentinian life table for females also closely follows the Latin American pattern; however, the male life table does not. The latter pattern is very close to that of Chile (described below) with relatively low mortality at the younger ages (except during infancy) and somewhat higher mortality at the later years. Further research is necessary to determine why Argentinian males should follow the Chilean pattern while the females follow the general Latin American patterns.

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[9] The relatively low level of mortality at the older ages is a point of some controversy as the figures may possibly reflect errors in the data rather than a true mortality experience. Nevertheless there is evidence that low death rates in the Latin American region from cardiovascular diseases may be a significant factor. See for example R.R. Puffer and G.W. Griffith, Patterns of Urban Mortality, Pan American Health Organization Scientific Report No. 151, (Washington, D.C., 1967), pp. 44-51 for results from a study of 12 American cities; and C. B. Nam, N. L. Weatherby, and K. A. Ockay, "Causes of Death which Contribute to the Mortality Crossover Effect," Social Biology, Vol. 25, No. 4, (Winter, 1978), pp. 306-314 for an analysis of causes of death responsible for the "crossover effect" in age patterns of mortality.

[10] For Brazil, see V. da MottaLeite, "Brasil: Estudo da Mortalidade por Sexo e Grupos de Idade durante o periodo 1950-1970", Revista Brasileira de Estadistica, vol. 34, no. 135 (Rio de Janeiro, 1973), pp. 435-464. For the Argentinian life tables see A. Ortega, Tablas Completas de Mortalidad para la República Argentina, 1959-1961, (United Nations CELADE, Santiago, 1967).

A second age pattern of mortality has been labelled the Far Eastern pattern. Goldman recently noted the existence of a distinctive pattern of mortality in selected Far Eastern populations. 12/ This pattern is characterized by high male death rates at older ages relative to their death rates at younger ages and very high sex ratios of mortality at the older ages. Goldman found some evidence that this pattern may be related to a high incidence of tuberculosis in the past which is still evident among adult males in these populations. Research at the United Nations has duplicated Goldman's findings for these populations and also found a similar pattern of high adult mortality relative to younger age mortality in Guyana and in Trinidad and Tobago. However, in these latter two populations females also show relatively high mortality at the adult ages so that the large sex differentials in mortality at these ages do not appear. A recent life table constructed for Peninsular Malaysia at the U.S. Bureau of the Census also shows this latter characteristic. 13/ The term "Far Eastern pattern" is generalized here to include age patterns characterized by high older age death rates relative to younger age death rates, irrespective of sex differentials. Among populations

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11/ See United Nations, Department of International Economic and Social Affairs, Population and Vital Statistics Report, Data available as of 1 April 1980 (New York, 1980), pp. 8-9.

12/ N. Goldman, "Far Eastern Patterns of Mortality", Population Studies, vol. 34, no. 1 (London, 1980), pp. 5-19.

13/ United States Bureau of the Census, Country Demographic Profiles: Malaysia, by G. S. Finch and A. Sweetser (Washington, D.C., 1979), table 5, p. 8.

so far identified as having this pattern are the male populations of Hong Kong, Singapore, the Republic of Korea, Peninsular Malaysia, Guyana, and Trinidad and Tobago; and the female populations of Singapore, Malaysia, Guyana, and Trinidad and Tobago.

A third pattern delineated is the South Asian pattern of mortality. This pattern shows, relative to West region tables, very high death rates under age 15 and at the oldest ages, with correspondingly lower mortality for the prime age groups. Reliable life tables for India, the Matlab-Thana area of Bangladesh, Iran and Tunisia all show this pattern. Similar patterns appear in less reliable life tables constructed for Pakistan, Nepal, Bangladesh and Turkey. 14/ Life tables constructed for Indonesia and China also show such a pattern with the exception of remarkably low mortality under age 5. 15/ Cause of death data are nearly nonexistent for these populations but it can be surmised that the South

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14/ Life tables for these countries appear in United States Bureau of the Census, Country Demographic Profiles: Pakistan, by F. B. Hobbs (Washington, D.C., 1980), table 5, p. 11; F. Yusuf, "Abridged Life Tables for Pakistan and its Provinces, 1962-64", Contributed Papers to the Sydney Conference of the International Union for the Scientific Study of Population, 21-25 August 1967, pp. 533-541; United States Bureau of the Census, Country Demographic Profiles: Nepal, by R. G. Kramer (Washington, D.C., 1980), table 5, p. 8; and Republic of Turkey and Hacettepe University, Vital Statistics from the Turkish Demographic Survey 1966-67 (Ankara, 1970), table 24, p. 121.

15/ For the Indonesian life tables see United States Bureau of the Census, Levels and Trends of Mortality in Indonesia, 1961 to 1971, by Larry Heligman, International Research Document No. 2 (Washington, D.C., 1975), tables B and C, pp. 3-4. The China data are unpublished.

Asian pattern is related to high incidences of infectious, parasitic and diarrhoeal diseases at the younger ages and high mortality from diarrhoeal and respiratory diseases at the oldest ages. 16/ It is interesting to note that the deviations in these life tables are very similar to those of the Coale-Demeny South region, except that the South region deviations are somewhat less extreme.

The fourth pattern of mortality presented in Figures 4.1 and 4.2 has been labelled the Chilean pattern. The Chilean pattern was estimated from Chilean life tables for the 1949-51, 1959-61 and 1969-71 periods. It has some similarities to the Far Eastern pattern except for an extremely high infant mortality rate due presumably to deaths from respiratory diseases. 17/ This pattern was unique in the sample of reliable life tables but is included because it may appear in areas where accurate evidence of age patterns of mortality is not yet available.

It appears that the above-mentioned patterns account for many of the variations of mortality in the less developed countries of Latin America, Asia and possibly Northern Africa. Age patterns of mortality in sub-Saharan Africa remain unknown, however, due to the extreme unreliability of the limited data available. The forthcoming United Nations volume, Levels and Trends of Mortality Since 1950 briefly examines patterns in seven selected sub-Saharan countries (Kenya, Madagascar, Mauritius, Réunion, the coloured population of South Africa, United Republic of Cameroun and Upper Volta) and concludes:

16/ Although reliability of cause of death data in this region is very low, data are tabulated and analyzed regularly as part of the Cholera Research Laboratory project in Matlab and as part of the Model Registration Project in rural India. The Matlab project finds high death rates from dysentery and respiratory diseases (including TB) among the adult population. In the India project, among those aged 55 and over, diseases of the "cough group" (including broncho-pneumonia, pneumonia, respiratory tuberculosis and bronchitis) plus diseases from the diarrhoea group accounted for about two thirds of all deaths. See Cholera Research Laboratory, Demographic Surveillance System-Matlab. Vol. 5: Vital Events, Migration and Marriages 1976, Scientific Report No. 13, (Dacca, 1978), p. 8; and India, Office of the Registrar General, Model Registration, Survey of Causes of Death: Report for 1971, Series 3, No. 5, (New Delhi, no date), pp. 11-14.

17/ World Health Organization, World Health Statistics Annual, 1979, Vol. 1, Vital Statistics and Causes of Death (Geneva, 1979), table 9. The Chilean rate is especially high for pneumonia (A91-92). It has also been suggested that early weaning may be responsible for Chile's high infant mortality rate. See S. J. Plank and M. L. Milanesi, "Infant feeding and infant mortality in rural Chile," Bulletin of the World Health Organization Vol. 48, No. 2 (1973), pp. 203-210.

"The results of these comparisons are disappointing with respect to discovering a single age pattern of mortality for sub-Saharan Africa. If the seven countries analyzed are representative, African data show a wide variety of mortality patterns. Some of these patterns are similar to the models of Coale and Demeny, others are not. Patterns under age 10 and over age 10 may resemble different Coale-Demeny models. However, given the unreliability of the data at hand, statements about the age patterns of mortality in this region must remain tentative".

(b) Sex differentials in mortality

At all levels of mortality and in all regions of the world, summary indices of mortality, such as life expectancy at birth, nearly universally show lower levels of mortality for females than for males. Exceptions that do occur have generally been for countries at high levels of mortality, and when mortality has declined, female mortality has generally improved faster than male mortality leading to a reversal of the differential and attainment of lower female mortality. Even when life expectancy at birth for females has been lower than that of males, analysis of death rates by age has often shown higher male mortality at nearly all ages with exceptions occurring only during the early childhood years or during the childbearing years. In this section sex differentials in life expectancy at birth and at age 10 in the group of reliable life tables constructed for the model life table project are examined followed by a discussion of differentials by age in a larger set of countries for which data are available.

Figures 4.3 and 4.4 respectively present plots of male life expectancy at birth against female life expectancy at birth and male life expectancy at age 10 against female life expectancy at age 10. The best fitting orthogonal regression line among the points is also shown.18/ Three symbols are used to represent respectively countries of Latin America, Asia (excluding the Far Eastern countries) and Far East Asia. The orthogonal regression line clearly separates the data regionally into these 3 groups. Generally the Asian countries outside the Far East fall below the line, indicating smaller sex differentials; the Latin American countries fall above the line indicating relatively larger sex differentials; and the Far Eastern countries are also above the line, but further displaced than the Latin American countries, indicating the largest sex differentials. That sex differentials should cluster geographically implies a role for geocultural factors in the determination of expected years of life and indicates that sex differentials in mortality may be related to the differential positions of the two sexes in their respective cultures as well as to biological and

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18/ Many studies have found a linear relationship between male and female life expectancy. See for example, S. H. Preston and J. A. Weed, "Causes of death responsible for international and intertemporal variation in sex mortality differentials", World Health Statistics Report, vol. 29, no. 3, (World Health Organization, Geneva, 1976).

Figure 4.3 Life expectancy at birth for males versus life expectancy at birth for females

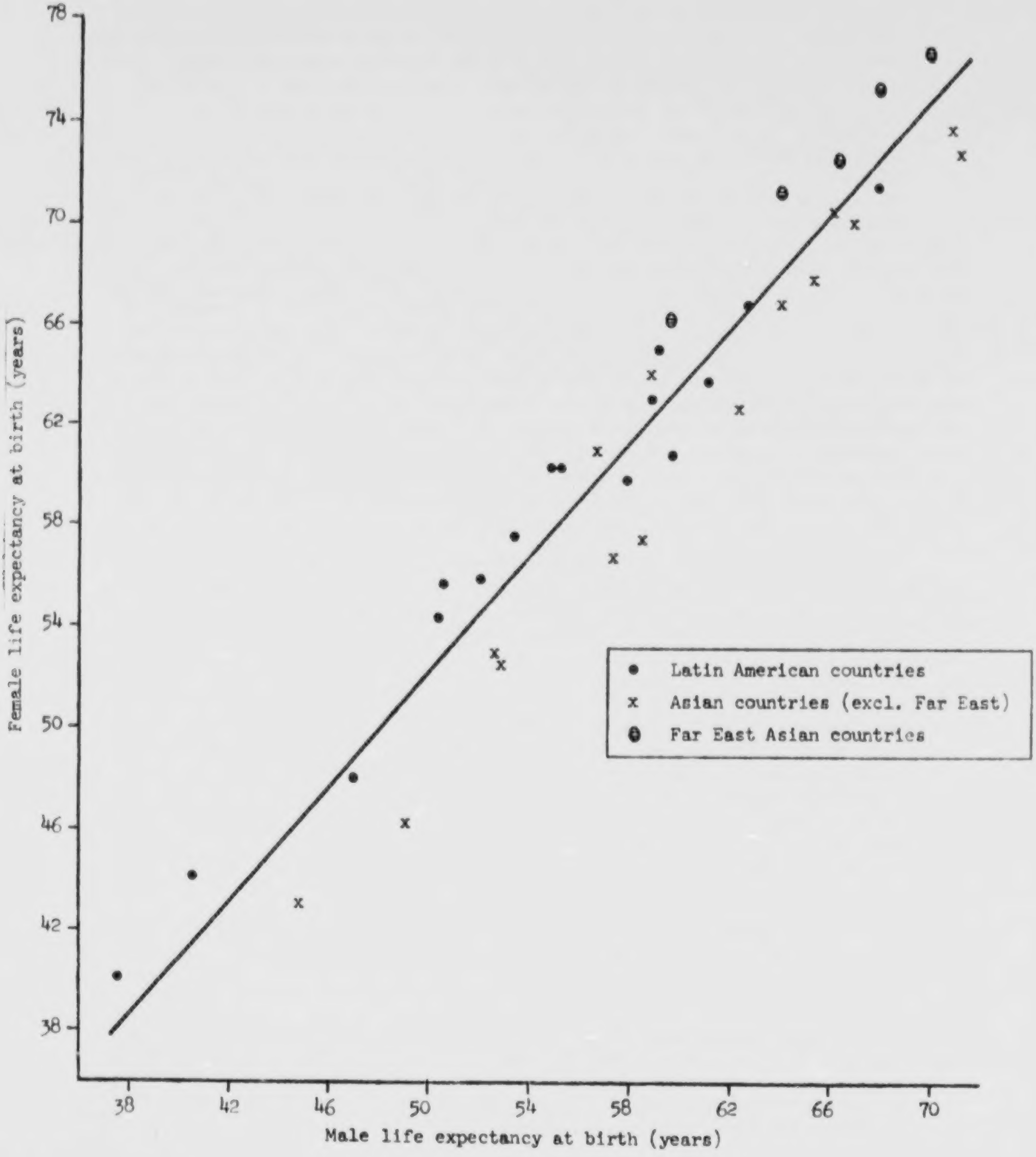
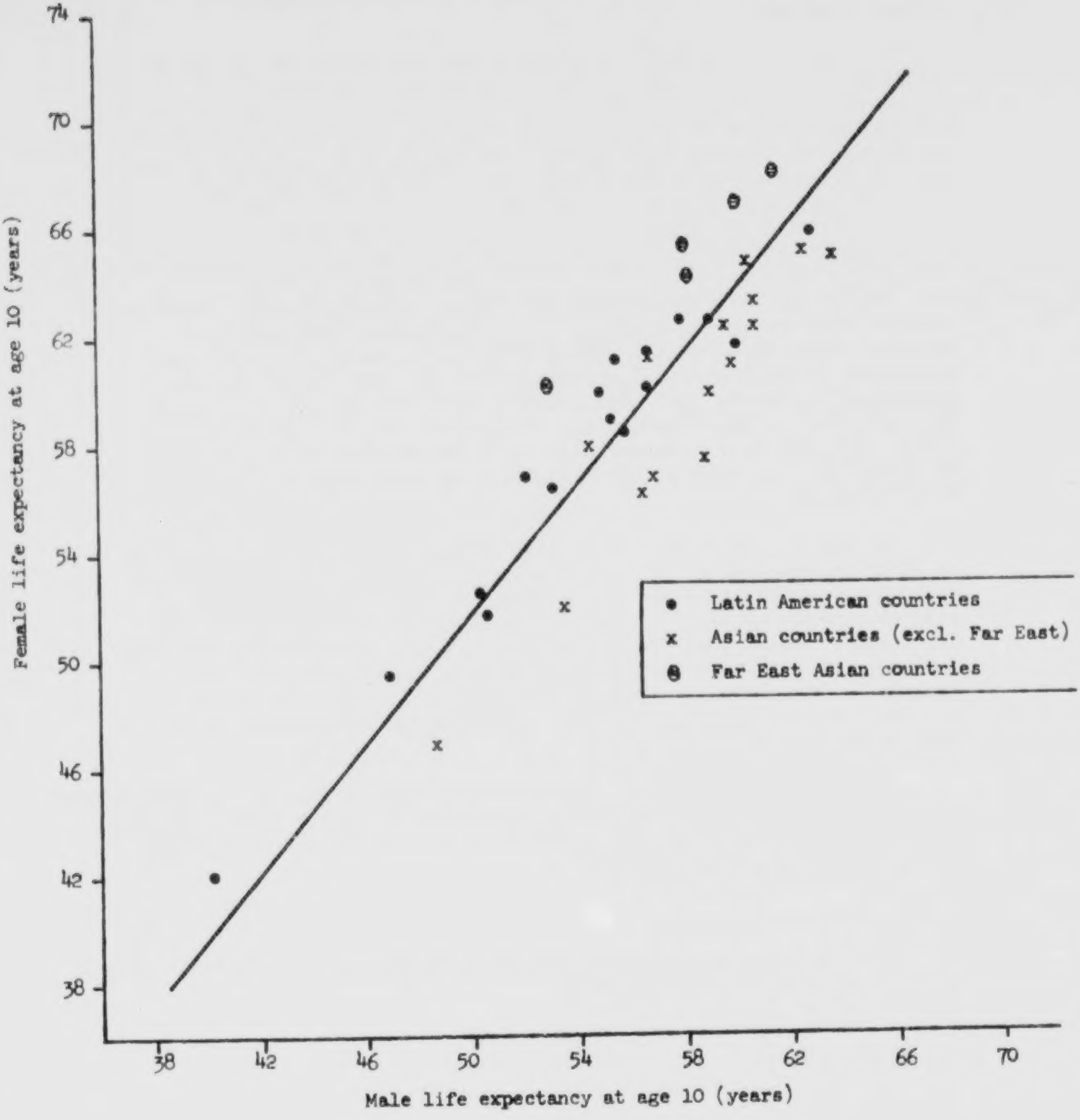


Figure 4.4 Life expectancy at age 10 for males versus life expectancy at age 10 for femalet



genetic variations in the aging process and length of life.

Interestingly, the clustering of sex differentials by geographical region allowed estimation of orthogonal regression lines separately for each region. These regression equations are presented pictorially in figures 4.5 and 4.6. It is important to note that the Far East line is based on only 5 countries, all with high life expectancies; any extrapolations based on this equation should be done with extreme caution.

Figures 4.5 and 4.6 also present the line based on the tables implicit in Coale and Demeny's West region model, a model comprising mainly Western European experience. The line is very close to the Latin American line as are the lines from the Coale and Demeny North, South and East regions (not shown). It appears that sex differentials in life expectancy at birth and age 10 for Latin American countries are very similar to historical European experience. Asian differentials differ, with all but Far East Asian countries showing smaller differentials and the Far Eastern Asian countries larger differentials.

Again the lack of reliable life tables has precluded a confident similar analysis of sub-Saharan African mortality differentials. However, using the life expectancy figures currently available and presented in the Historical Supplement to the 1978 United Nations Demographic Yearbook 19/ this exercise has been repeated based on 25 countries for which empirical life tables are available. It should be remembered, though, that the poor quality of the data and at times indirect methods of estimation employed make any conclusion very tentative.

Figure 4.7 presents the scatter diagram of male life expectancy at birth versus female life expectancy as well as the corresponding orthogonal regression line. When compared to sex differentials in life expectancy at birth for the other regions, sub-Saharan African sex differentials appear to be similar to those of the Latin American countries at higher levels of mortality but appear to widen more quickly as mortality declines so that at lower levels sub-Saharan African sex differentials are somewhere between those of Latin America and Far East Asia.

To simplify comparison, table 4.5 presents predicted sex differentials in life expectancy at birth at four different mortality levels for each of the less developed regions and for the regions of the Coale and Demeny model life table system.

19/ Historical Supplement to the 1978 Demographic Yearbook (United Nations publication, forthcoming).

Figure 4.5 Life expectancy at birth for males versus life expectancy at birth for females

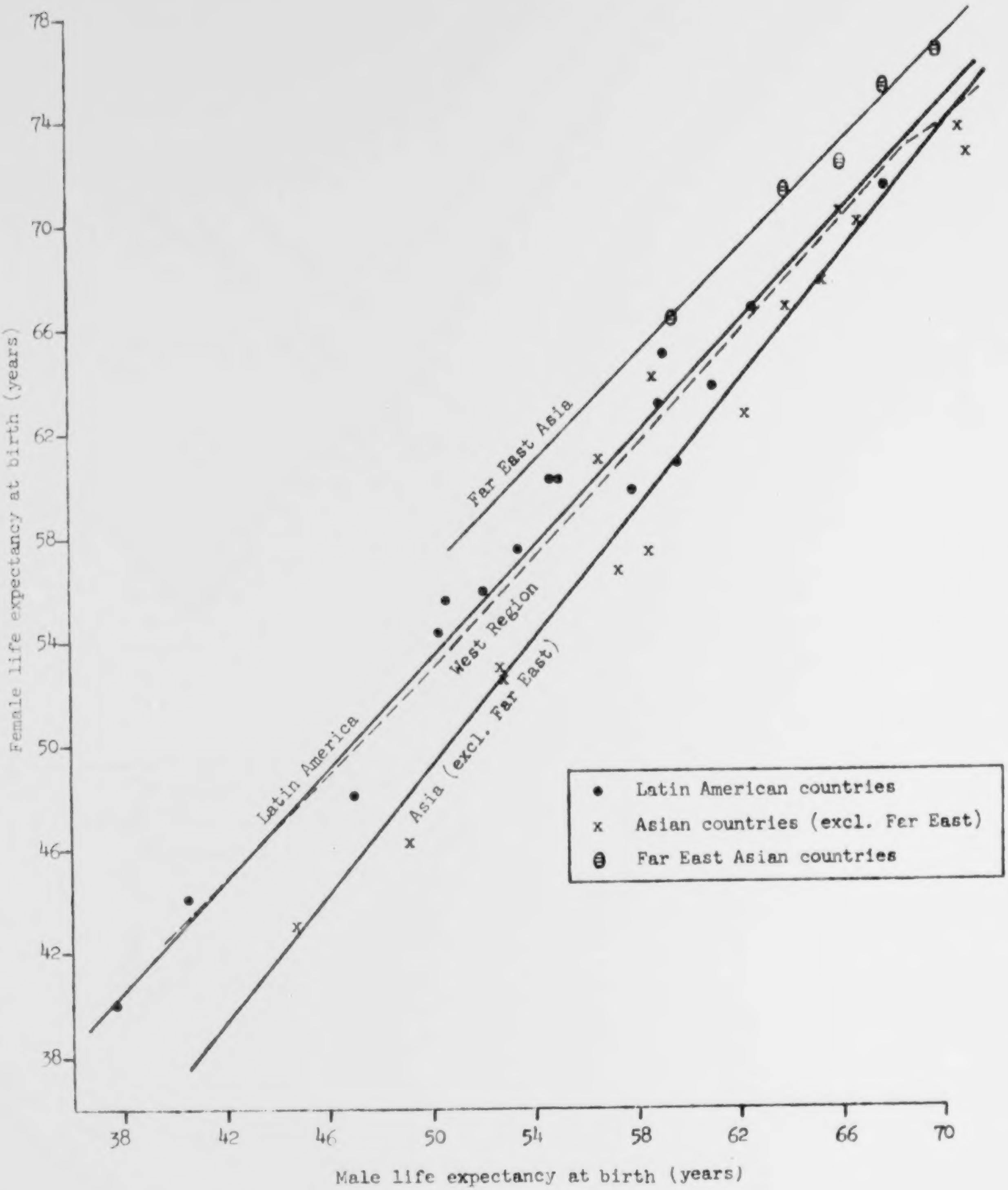


Figure 4.6 Life expectancy at age 10 for males versus life expectancy at age 10 for females

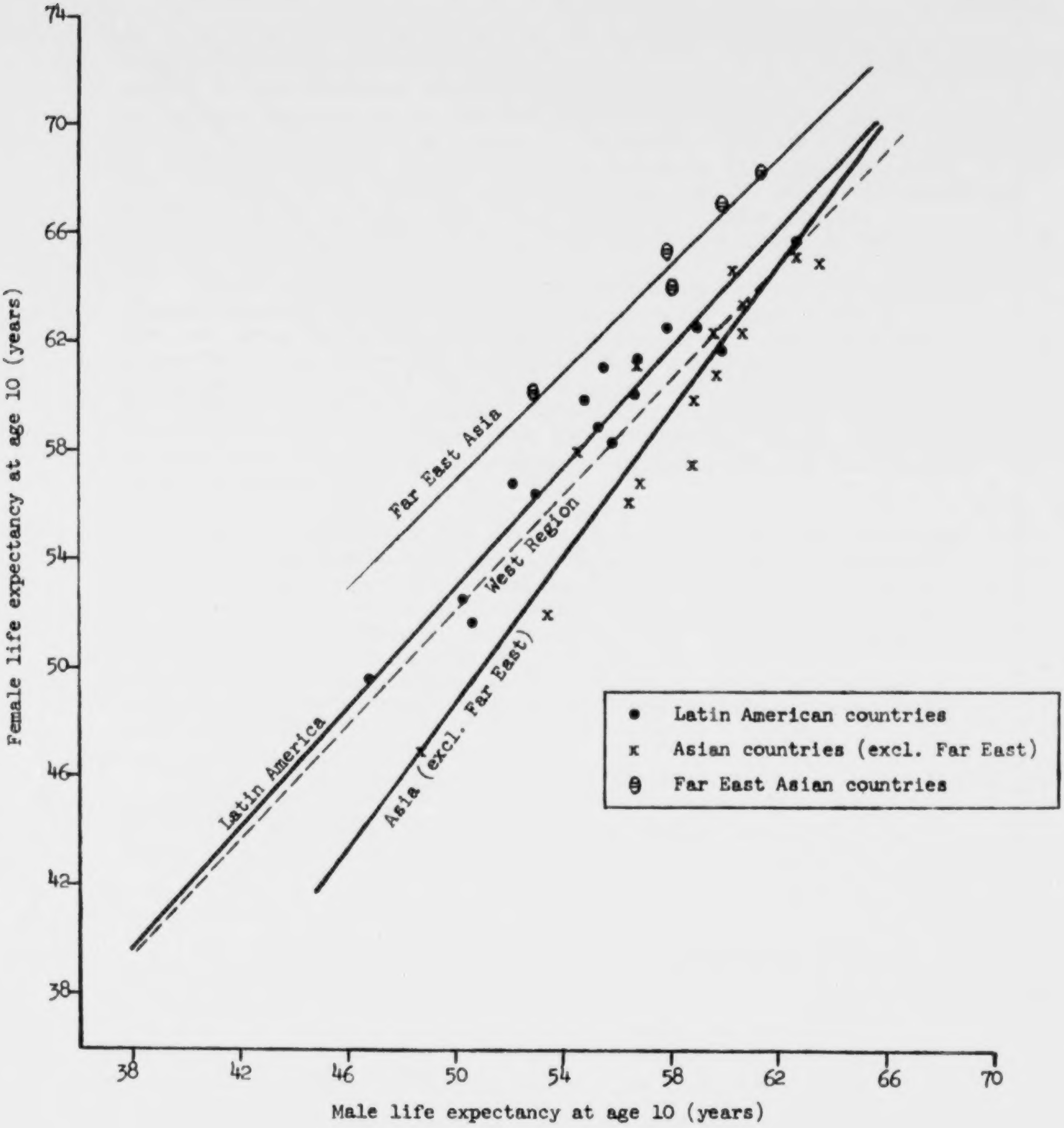


Figure 4.7 Life expectancy at birth for males versus life expectancy at birth for females : **sub-Saharan Africa**

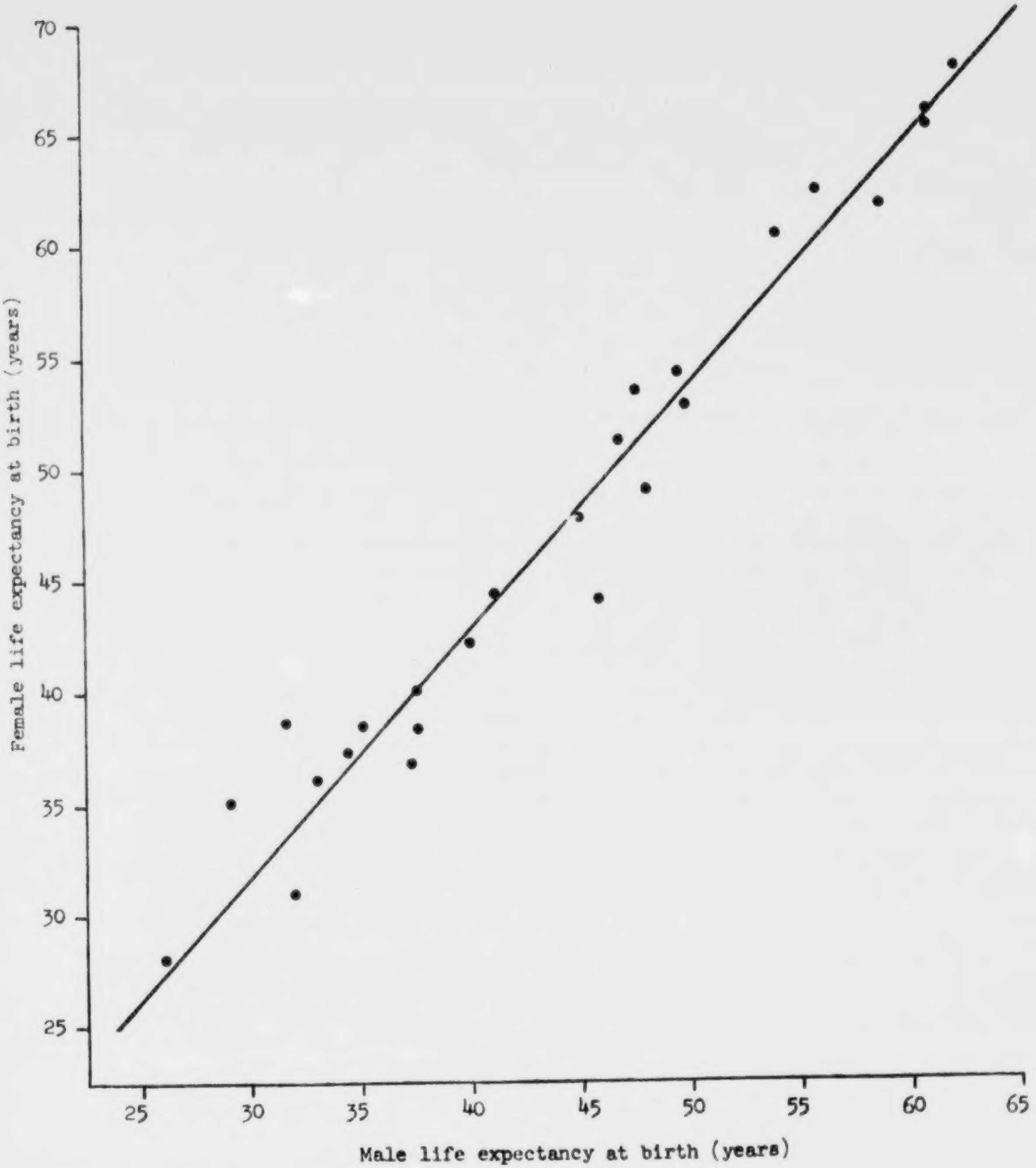


Table 4.5. Female minus male life expectancy at birth (in years)

Regions	Life expectancy at birth (both sexes combined) 40 years	50 years	60 years	70 years
Latin America	2.1	3.3	4.0	4.6
Asia excl. Far East	-2.9	-0.8	1.4	3.5
Far East Asia	x	x	6.8	7.1
Sub-Saharan Africa	2.8	3.8	4.7	5.7
West region	2.7	2.9	3.6	4.0
North region	3.1	3.4	3.7	3.7
East region	2.9	3.4	4.1	4.7
South region	1.7	2.8	3.8	3.9

The Historical Supplement to the 1978 United Nations Demographic Yearbook presents life expectancies at birth by sex for the 1948-1977 period for all countries. Restricting our attention to those life expectancy estimates based on the most recent empirical life tables (that is, excluding figures provided by the Population Division of the United Nations), it is clear that higher female life expectancy at births is a nearly universal phenomenon. There are only 4 exceptions in Africa (Liberia, 1971; Nigeria, 1965-1966; Upper Volta, 1960-1961; and Tunisia, 1968-1969), 6 exceptions in Asia (Democratic Kampuchea, 1958-1959; Iran, 1973-1976; Jordan, 1959-1963; Sabah in Malaysia, 1970; Pakistan including Bangladesh, 1962; and India, 1970-1972), and no exceptions in Latin America. 20/ Even among these exceptions in only 4 countries (Liberia, India, Sabah and Pakistan) are the differentials greater than one year. Moreover, in many if not all of these countries the relatively poor quality of the data often raises doubts as to the validity of the observed differentials.

20/ The Tunisia and India life tables are not shown in the Demographic Yearbook but were available from life tables constructed for the model life table project.

As stated previously, most examples of higher female than male mortality, are limited to the ages of childhood and childbearing. 21/ In the North African region, females show higher mortality than males in life tables from Egypt (1960 and 1965) for all ages under 5, in life tables from Tunisia (1968-1969) for ages 1-4 years and during the entire childbearing period, and in life tables from Algeria (1969-1971) from ages 1 to 40 years.

As in Northern Africa, there are also in sub-Saharan Africa some age-groups in which death rates are greater for females than males. With respect to the childhood years, the Kenya data show higher female than male mortality for all ages under 10 years, as do data for Mauritius for ages 1-9. The data for Upper Volta present higher female death rates for children aged 5-14 years and nearly identical death rates for boys and girls under 5. For the United Republic of Cameroon, the coloured population of South Africa, and Reunion, the death rates at ages 1-4 are only marginally (2-3 percent) higher for males than females.

During the childbearing years excess female mortality is estimated in the United Republic of Cameroon for ages 25-39, in Upper Volta for ages 20-34 and 40-44, and in Mauritius for ages 20-34. In addition, the registered death rates in Madagascar, before adjustment for the incompleteness of death registration display higher female than male death rates for ages 20-34. It is possible that faulty adjustment of the death registration data has disguised the true male-female differential in mortality. 22/ Female mortality also seems to be higher than male mortality for part of the childbearing years in Benin (1961) for ages 20-29, Central African Republic (1959-1960) for ages 10-39, and Liberia (1970) for ages 15-19 and 40-44.

During the remainder of the life span, the typical pattern of excess male mortality is generally exhibited. Upper Volta remains an exception, however. The 1960-1961 survey recorded higher female mortality for ages 50-54 and 60-69. Upper Volta, in fact, appears to be a special case in which the recorded suvery data show very similar levels and age patterns of mortality for both males and females. This results in an alternating direction of excess mortality throughout the life span with females having excess mortality in nine of 16 age-groups.

Female mortality in Asia is generally higher than male mortality during early childhood and the reproductive ages. During the early childhood years, females exhibit higher mortality than males in Sri

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21/ The following paragraphs are summarized from the forthcoming United Nations volume Levels and Trends of Mortality Since 1950. Citations for the data described will be found there.

22/ In fact, the surprisingly large sex differential in life expectancy at birth (6 years) based on the adjusted rates lend credence to the view that the death registration data may have been adjusted incorrectly. The sex differential in life expectancy based on unadjusted rates is only 1.2 years.

Lanka (1945-1947, 1952-1954 and 1970-1972), India (1958-1959 and 1970-1972), and the rural area of Matlab in Bangladesh (1974-1976). Referring to this higher female mortality during early childhood, the Indian Government noted that "...there is a traditional fondness for male issues in most parts of the country and a corresponding dislike for female children; All the affection and care is [sic] bestowed on male children but female children are not much cared for..." 23/ Higher female than male mortality at ages 1-4 years is also found in recent life tables from Burma (urban areas), Iran, Iraq, Pakistan, Republic of Korea (where the male advantage was slight) Thailand, and Malaysia.

Mortality among females is also higher than that of males during the childbearing years in a number of Asian countries. An analysis of age-specific death rates for 19 populations found that in 7, the death rates for women were higher than the ones for men in at least three of the five-year age-groups during the reproductive years (i.e., 15-49 years). These were Bangladesh, India, Pakistan, Jordan, Iran, and Sabah and Sarawak in Malaysia.

In Latin America there is presently no consistent evidence in any country of higher mortality among females during either infancy or the childbearing years. However, there remain some countries exhibiting higher mortality among females than males during the childhood years from 1-4. These countries are Guadeloupe, Martinique, Costa Rica, Guatemala, Mexico, Colombia and Ecuador. In Argentina, Chile and Uruguay previous life tables have shown higher female mortality during the childbearing ages but in the most recent tables the usual male excess mortality now appears. It is possible that in these Latin American countries the excess female mortality will also disappear as total mortality continues to decline.

In summary, then, it appears that it is not uncommon in the developing world for female mortality to exceed that of males for some or all of the childhood years and it is quite common for females to exhibit higher mortality during all or part of the childbearing ages. During the remaining years, males generally have higher death rates. The net result of these differentials is in most instances (with the notable exception of the higher mortality countries of Asia) greater female than male life expectancy at birth. The size of the sex differential in life expectancy at birth varies noticeably, however, with geocultural region and mortality level.

23/ India, Office of the Registrar General, Census of India, 1951, Life Tables, Paper 2 (New Delhi, 1954), p. 26. See also T. Dyson, "Levels, trends, differentials and causes of child mortality -- a survey", World Health Statistical Report, vol. 30, No. 4 (1977), p. 291.

B. The developed countries

The discussion of mortality in the more developed regions which follows is confined to the 1970s. Trends in three mortality measures are examined -- the crude death rate, the expectation of life at birth and the infant mortality rate. In addition, changes in life expectancy at birth between 1970 and the late 1970s are analysed to determine the contribution of mortality decline in three broad age-groups to increases in life expectancy.

Recent mortality patterns in the developed countries reflect a countinuation of earlier trends: expectation of life at birth continued its upward climb, reaching new highs for males and females, infant mortality fell to new lows, and the gap between male and female life expectancy grew larger.

Trends in the crude death rate reflect not only changes in age-specific mortality, but changing population age structure as well. The value of the crude death rate for mortality analysis is, therefore, limited. As one of the two components of natural increase, the crude death rate is, nevertheless, useful as a measure of net change within a population. In the 1979 Report on Monitoring of Population Trends,24/ it was reported that in a handful of countries the crude death rates for one or more years in the 1970s was equal to, or higher than, the crude birth rate. These countries were Austria, Federal Republic of Germany, German Democratic Republic, Luxembourg, and England and Wales and Scotland in the United Kingdom. The same group of countries had in 1978 a crude death rate very close to, or higher than, the crude birth rate. The situation was most pronounced in the Federal Republic of Germany, which had a crude death rate of 11.8 deaths per thousand population, compared with a crude birth rate of only 9.4 births per thousand population.

In the developed countries, where the population has been aging, the crude death rate would be expected to increase even if mortality had not changed. However, in most of these countries, mortality has been declining in the 1970s, as will be seen from the discussion of life expectancy at birth. The increases in the crude death rates since 1970 shown in Table 4.6 for several of these countries (namely Hungary, Poland, Denmark, Greece and Sweden) were due to population aging, as their overall mortality level has remained virtually unchanged (Hungary) or has declined since 1970. In Bulgaria and the USSR, however, the sizable increases in the crude death rate since 1970 reflect to some extent increasing mortality. In many developed countries, mortality decline in the 1970s was sufficient to offset the unfavourable effects of population aging on the crude death rate, which showed a decline

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24/ World Population Trends and Policies: 1979 Monitoring Report, Vol. I., op. cit.

Table 4.6 Crude death rates and indexes of rates, more developed countries, 1970-1978

Region and country	Crude death rates (Deaths per 1,000 population)					Index (1970 = 100)				
	1970	1975	1976	1977	1978	1970	1975	1976	1977	1978
Northern America										
Canada	7.3	7.4	7.3	7.2	7.3	100	101.4	100.0	98.6	100.0
United States	9.4	8.9	8.9	*8.8	...	100	94.7	94.7	*93.6	...
Asia										
East Asia										
Japan	6.9	6.3	6.2	6.1	6.1	100	91.3	89.9	88.4	88.4
Europe										
Eastern Europe										
Bulgaria	9.1	10.3	10.1	10.7	10.5	100	113.2	111.0	117.6	115.4
Czechoslovakia	11.6	11.5	11.4	*11.5	*11.5	100	99.1	98.3	*99.1	*99.1
German Democratic Rep. a/	14.1	14.3	13.9	*13.4	*13.9	100	101.4	98.6	*95.0	*98.6
Hungary	11.6	12.4	12.5	12.4	*13.1	100	106.9	107.8	106.9	*112.9
Poland	8.2	8.7	8.8	9.0	*9.3	100	106.1	107.3	109.8	*113.4
Romania	9.5	9.3	9.6	9.6	9.7	100	97.9	101.1	101.1	102.1
Northern Europe										
Denmark	9.7	10.1	10.6	*9.9	*10.4	100	104.1	109.3	*102.1	*107.2
Finland	9.6	9.3	9.5	*9.4	*9.2	100	96.9	99.0	*97.9	*95.8
Ireland	11.4	10.6	*10.5	*10.5	*10.3	100	93.0	*92.1	*92.1	*90.4
Norway	10.0	10.0	10.0	9.8	*9.9	100	100.0	100.0	98.0	*99.0
Sweden	10.0	10.8	11.0	*10.7	*10.8	100	108.0	110.0	*107.0	*108.0
United Kingdom	11.8	11.9	12.2	*11.7	*11.9	100	100.8	103.4	*99.2	*100.8
England and Wales	11.8	11.9	12.2	*11.7	*11.9	100	100.8	103.4	*99.2	*100.8
Northern Ireland	10.9	10.7	11.1	11.0	11.0	100	98.2	101.8	100.9	100.9
Scotland	12.2	12.1	12.5	12.0	*12.6	100	99.2	102.5	98.4	*103.3

Region and country	Crude death rates (Deaths per 1,000 population) 1970	1975	1976	1977	1978	Index (1970 = 100) 1970	1975	1976	1977	1978
Europe (continued)										
Southern Europe										
Albania	9.3	...	...	...	...	100	...	...	...	...
Greece	8.4	8.9	8.9	*8.9	8.7	100	106.0	106.0	*106.0	103.6
Italy	9.7	9.9	9.8	*9.6	*9.4	100	102.1	101.0	*99.0	*96.9
Malta	9.4	8.8	9.0	8.6	*10.0	100	93.6	95.7	91.5	*106.4
Portugal	10.3	10.4	10.5	*9.6	*9.8	100	101.0	101.9	*93.2	*95.1
Spain	8.3	8.4	8.1	7.8	*7.9	100	101.2	97.6	94.0	*95.2
Yugoslavia	8.9	8.7	8.5	*8.4	*8.7	100	97.8	95.5	*94.4	*97.8
Western Europe										
Austria	13.3	12.8	12.7	*12.2	*12.5	100	96.2	95.5	*91.7	*94.0
Belgium	12.3	12.2	12.1	*11.4	*11.7	100	99.2	98.4	*92.7	*95.1
France	10.7	10.6	10.5	*10.1	*10.3	100	99.1	98.1	*94.4	*96.3
Germany, Fed. Rep. of a/	12.1	12.1	11.9	11.5	*11.8	100	100.0	98.3	95.0	*97.5
Luxembourg	12.3	12.2	12.6	*11.5	11.8	100	99.2	102.4	*93.5	95.9
Netherlands	8.4	8.3	8.3	7.9	*8.2	100	98.8	98.8	94.0	*97.6
Switzerland	9.1	8.7	9.0	8.8	9.1	100	95.6	98.9	96.7	100.0
Oceania										
Australia-New Zealand										
Australia	9.0	7.9	8.1	7.7	*7.6	100	87.8	90.0	85.6	*84.4
New Zealand	8.8	8.2	8.2	8.4	...	100	93.2	93.2	95.5	...
USSR	8.2	9.3	9.5	9.6	...	100	113.4	115.9	117.1	...

Sources: Historical Supplement (forthcoming, 1980) to the Demographic Yearbook 1978; and Population and Vital Statistics Report; Data Available as of 1 April 1980 (United Nations publication, Sales No. ST/ESA/STAT/SER.A/132).

Note: Data are for countries that evaluate their completeness of death registration as 90 per cent or above.

... Data not available.

* Provisional.

a/ The data which relate to the Federal Republic of Germany and the German Democratic Republic include the relevant data relating to Berlin for which separate data have not been supplied. This is without prejudice to any question of status which may be involved.

between 1970 and 1977 or 1978. Among these countries were the United States, Japan, the countries of Western Europe, Australia and New Zealand.

The continued aging of the population in the more developed countries has also affected the distribution of deaths by age, with increasing proportions of total deaths occurring in the old age-groups. The table below gives the percentage of total deaths occurring in the age-group 75 years and over in 1970 and in the late 1970s for selected countries. As can be seen from the table, in several countries more than half of the total number of deaths occurred at ages over 75 years im the late 1970s. One consequence of this concentration of mortality in old age-groups is that short term changes in general mortality levels are being increasingly affected by changes in the mortality of the elderly, who are more vulnerable to year-to-year fluctuations in the incidence of influenza and harsh weather conditions.[25]

Percentage of total deaths occurring in age group 75 and over, 1970 and the late 1970s

Country	1970	Late 1970s	Country	1970	Late 1970s
Austria	43	51	Netherlands	45	50
Canada	40	41	Norway	48	53
Denmark	44	49	Poland	31	37
France	47	50	Sweden	49	54
Germany, Fed. Rep. of	42	49	Switzerland	45	51
Hungary	38	42	United Kingdom		
Italy	42	46	England and Wales	44	48
Japan	35	43	United States	38	42
			Yugoslavia	30	36

The expectation of life at birth, which summarizes mortality at all ages, is a better measure than the crude death rate for studying mortality changes within countries, as well as in making international comparisons, for it is not affected by age structure. The life expectancy values for most of the countries in Table 4.7 have been calculated by the World Health Organization from data in its files on numbers of deaths and population by age and sex. These

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[25] United Kingdom, Office of Population Census and Surveys, *Population Trends*, No. 18 (Winter 1979), p. 5.

Table 4.7 Trends in expectation of life at birth, countries in more developed regions, 1970-1978

(Years)

Region and country	Males 1970	Males 1975	Males 1978	Females 1970	Females 1975	Females 1978
Northern America						
Canada	69.3	69.8	70.5 a/	76.2	77.3	78.2 a/
United States	67.1 b/	68.7	69.4	74.8 b/	76.7	77.3
Asia						
East Asia						
Japan	69.5	71.9	73.2	74.9	77.2	78.6
Europe						
Eastern Europe						
Bulgaria	69.1	68.7	68.2 a/	73.5	73.5	73.5 a/
Czechoslovakia	66.3	67.2	...	73.2	73.6	...
German Democratic Rep.	68.1 c/	68.6	68.9 d/	73.3 c/	74.1	74.5 d/
Hungary	66.3	66.4	66.1	72.2	72.5	72.8
Poland	66.2 e/	67.3	66.5	73.5 e/	74.8	74.9
Romania	65.7	67.5 f/	67.3	70.4	72.1 f/	72.4
Northern Europe						
Denmark	71.0	71.5	71.7	76.1	77.2	77.7
Finland	67.0 g/	67.4	...	75.8 g/	76.3	...
Ireland	68.6	69.0	...	73.2	74.3	...
Norway	71.0	71.4 g/	72.4	77.5	77.9 g/	78.8
Sweden	72.3	72.2	72.5	77.4	78.1	79.0
United Kingdom						
England and Wales	68.8	69.4 f/	70.2 a/	75.2	75.7 f/	76.3 a/
Northern Ireland	67.7	67.5	67.5 a/	73.6	74.0	74.1 a/
Scotland	67.0	67.8	68.2	73.3	74.4	74.4
Southern Europe						
Greece	71.6	72.2	72.9	76.0	76.7	77.6
Italy	68.5	69.8	...	74.6	76.1	...
Malta	68.0	...	68.8 a/	72.9	...	72.6 a/
Portugal	65.3 h/	65.1	...	71.0 h/	72.6	...
Spain	69.0 i/	70.3	70.8 d/	74.4 i/	76.1	76.7 d/
Yugoslavia	65.1	67.1	67.8 a/	69.9	71.9	73.0 a/
Western Europe						
Austria	66.4	67.6	68.4	73.4	74.7	75.7
Belgium	67.8	68.8	68.9 d/	74.2	75.3	75.5 d/
France	69.1	69.5 f/	69.9 d/	76.7	77.6 f/	77.9 d/
Germany, Fed. Rep. of	67.3	68.1	69.2	73.6	74.7	76.0
Luxembourg	66.4	67.5 f/	68.3	73.1	74.7 f/	75.8
Netherlands	70.9	71.5	72.0	76.6	77.9	78.7
Switzerland	70.2 e/	71.6	72.0	76.4 e/	78.2	78.9

Region and country	Males 1970	 1975	 1978	Females 1970	 1975	 1978
Oceania						
Australia-New Zealand						
Australia	67.4	69.3	70.0 a/	74.2	76.4	77.0 a/
New Zealand	68.7 e/	68.9	69.4 d/	75.0 e/	75.4	75.6 d/
USSR	64 j/	—— 63 k/ ——		74 j/	—— 74 k/ ——	

Sources: Unless otherwise indicated, various issues of World Health Organization, World Health Statistics Annual (Geneva).

Note: Unless otherwise indicated, values of life expectancy have been calculated by the World Health Organization from data on deaths and population by age and sex in the World Health Organization data bank. These values may, therefore, differ from official country life table values.

a/ 1977.

b/ Official life table values from United States, Department of Health, Education and Welfare, Public Health Service, Health, United States, 1979 (Washington, D.C., Government Printing Office, 1980), p. 90.

c/ Official life table values from German Democratic Republic, Staatliche Zentralverwaltung für Statistik, Bevölkersstatistisches Jahrbuch der Deutschen Demokratischen Republik 1977 (Berlin, 1977), p. 128.

d/ 1976.

e/ 1971.

f/ 1974.

g/ 1973.

h/ Official life table values from Demographic Yearbook 1972 (United Nations publication, Sales No. E/F.73.XIII.1), p. 616.

i/ 1969.

j/ Official life table values for 1971-1972 given in Demographic Yearbook 1978 (United Nations publication, Sales No. E/F.79.XIII.1), p. 416.

k/ Unofficial estimate for the mid 1970s given in Christopher Davis and Murray Feshbach, Rising Infant Mortality in the U.S.S.R. in the 1970's, United States, Bureau of the Census, Series P-95, No. 74 (Washington, D.C., 1980), p. 1.

values have been used in order to make comparisons among countries for the same years, as many countries do not construct life tables annually. These unofficial life expectancy values may, therefore, differ somewhat from those of the official life tables, but the differences are not likely to alter the main conclusions of the analysis.

Between 1970 and the late 1970s (i.e., the latest year for which data were available, as shown in Table 4.7), overall mortality declined in the more developed countries, resulting in an average (unweighted) increase in life expectancy at birth of about one year for males (from 68.1 to 69.2 years) and 1.5 years for females (from 74.3 to 75.8 years). The changes between 1970 and the late 1970s with respect to the number of countries at each level of life expectancy at birth are depicted in the bar graph in Figure 4.8. The range of life expectancies for females has shifted upward from a range of 69 to 77 years in 1970 to one of 72 to 79 years in the late 1970s. Whereas there were no countries with a life expectancy for females greater than 78 years in 1970, six countries had exceeded this level by the late 1970s. These were Canada, Japan, Netherlands, Norway, Switzerland and Sweden. Although Iceland has not been included in this tabulation because of its small population size (fewer than 300,000 inhabitants), life expectancy at birth for females in 1978 was 80.0 years, based on the WHO calculations described above. This continued decline in female mortality during the 1970s from levels which were already very low has been a noteworthy feature of recent mortality trends. It is clear that the limits of average life expectancy at birth which a population can attain under the most favourable medical and environmental conditions are not known, and continue to be revised upward. 26/

The mortality trends for males in the 1970s have not been as favourable as those for females, and as a result the average gap between the sexes in life expectancy at birth continued to increase, from a differential of 6.2 years in 1970 to one of 6.6 years in the late 1970s. It can be seen from Figure 4.8 that the range of life expectancies for males widened from a range of 64 to 72 years in

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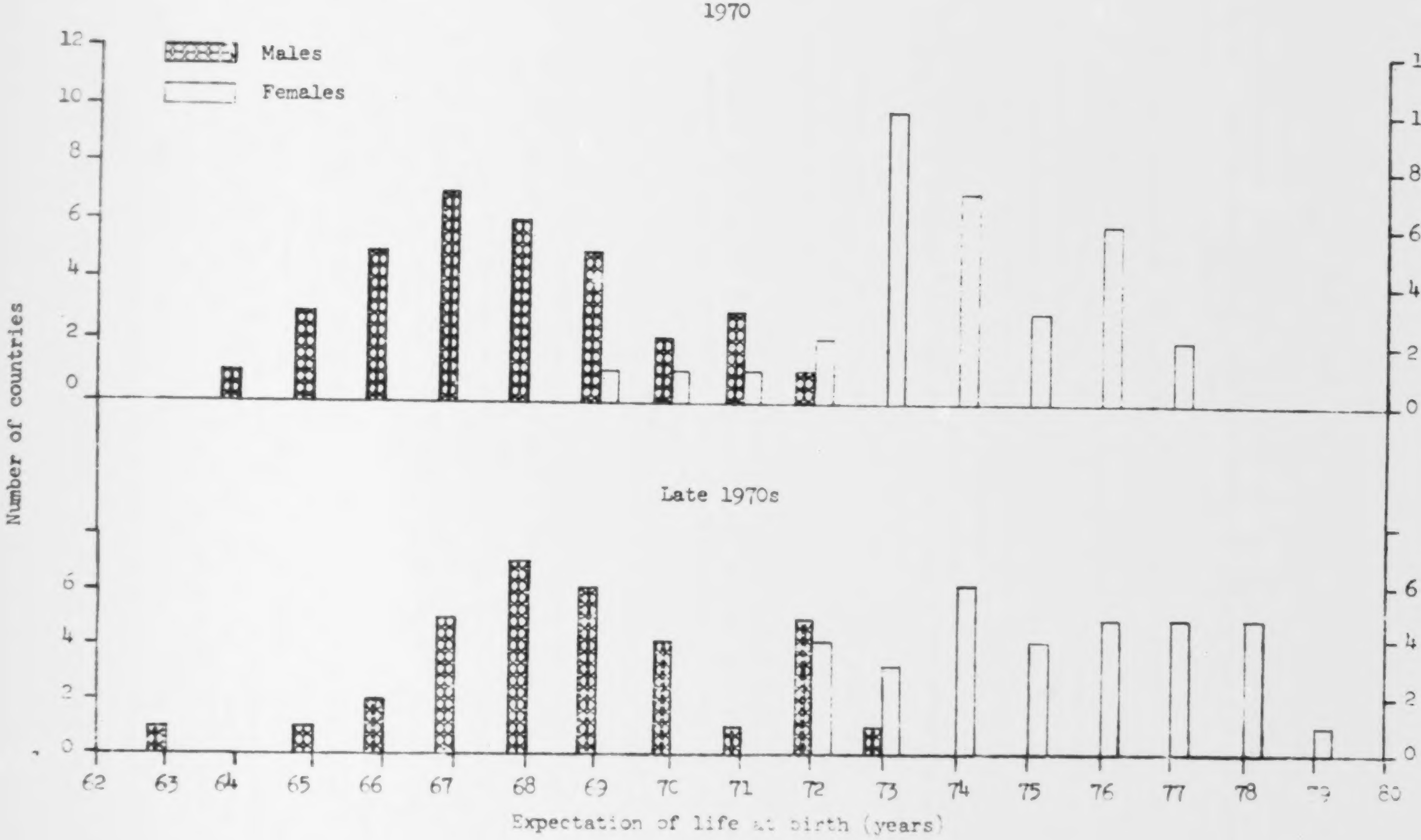
26/ In 1978, Bourgeois-Pichat estimated the biological limits for life expectancy at birth, i.e. the life expectancy that would result if all exogenous causes of death were eliminated, as 73.8 years for males and 80.3 years for females, based on mortality data for Norway, the country with one of the lowest mortality levels. Exogenous mortality was defined as including deaths from infective and parasitic diseases; deaths due to diseases of the respiratory system; and deaths due to accidents and violence. See Jean Bourgeois-Pichat, "Future outlook for mortality decline in the world", Population Bulletin of the United Nations, No. 11 - 1978 (United Nations publication, Sales No. ST/ESA/SER.N/11), pp. 12-41.

Figure 4.8 Frequency distributions of expectation of life at birth, 33 countries in more developed regions, 1970 and late 1970s



Source: Life expectancy values have been tabulated from data given in Table 2 according to intervals from 63.0 to 63.9 years, 64.0 to 64.9 years, etc., rather than rounded to the nearest whole number.

1970 to one of 63 to 73 years in the late 1970s. The decline in the lower limit from 64 to 63 years reflects increased mortality in the USSR. At the upper end of the range for males, the number of countries with life expectancies of 72 years or greater increased from 1 in 1970 to 6 in the late 1970s. These were Greece, Japan, Netherlands, Norway, Sweden and Switzerland. Japan had the highest life expectancy at birth -- 73.2 years. However, had Iceland been included, it would have ranked first, with a life expectancy of 73.8 years in 1978, the same value estimated to be the biological limit for males by Bourgeois-Pichat. 27/

In Table 4.7, expectation of life at birth for each country is given for 3 years in the 1970s -- 1970, 1975 and the most recent year for which data were available. In order to determine if the pace of improvement in the late 1970s differed from that of the early 1970s, average annual changes in life expectancy were computed by country for the two time intervals 1970-1975 and 1975-1978 or latest available year. There was no consistent pattern of differences among the countries between these two intervals, and the average annual increases were virtually the same in both intervals: for males, 0.17 years in the earlier interval and 0.18 years in the later interval; and for females, 0.24 years and 0.25 years, respectively.

There was considerable variation among the countries in the pace of mortality improvement in the 1970s. Based on Table 4.7, gains in life expectancy at birth of two years or more for both sexes combined were attained by Australia, Austria, Japan, Luxembourg, the United States and Yugoslavia. These countries are widely dispersed geographically and also range widely in level of life expectancy from among the lowest (Yugoslavia) to one of the highest (Japan).

The increases in life expectancy in Japan in the 1970s are particularly noteworthy, not only because of their rapidity (a gain of 3.7 years, or 0.46 years annually, for both males and females between 1970 and 1978), but also because they occurred at life expectancy levels which were already quite high. Male life expectancy increased from 69.5 years in 1970 to 73.2 years in 1978. This level of life expectancy had been attained by several countries some three decades earlier, but progress thereafter has been extremely slow in these countries, with the result that they now trail Japan (see text table below). Nevertheless, the 1970s figures for Denmark, the Netherlands and Norway suggest a more rapid improvement

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27/ Ibid.

in the 1970s than in the two preceding decades.

Life expectancy at birth, males

(years)

Years	Japan	Years	Denmark	Netherlands	Norway	Sweden
1949-50	56.2	1951-55	69.9	70.9	71.1	70.5
1960-64	66.5	1961-65	70.3	71.7	71.0	71.6
1970-74	70.4	1971-75	70.9	71.2	71.4	72.1
1978	73.2	1978	71.7	72.0	72.4	72.5

Sources: For 1978, Table 4.7. For earlier years, official life table values from Levels and Trends of Mortality Since 1950 (United Nations publication, forthcoming), Table II.A.1. Figures for Japan for 1960-64 and 1970-74 are averages of values from official life tables for individual years.

The most striking feature of the female life expectancy trends in the 1970s, as already mentioned, has been their steady climb upward in nearly all countries, with a few pauses but no retrogressions.

The least favourable trends in the 1970s occurred in the Eastern European countries and the USSR. In Bulgaria, Hungary and the USSR, male life expectancy declined.

Changes in life expectancy at birth may be decomposed to determine the contribution of mortality changes in various age-groups to total changes in life expectancy. In a recent United Nations study, changes in life expectancy at birth were decomposed into three broad age-groups for two periods, approximately from the early 1950s to the early 1960s, and from the early 1960s to the early 1970s. 28/ The three age-groups were: under 30, 30 to 64, and 65 years and over. Although the patterns varied among countries, during the earlier of the two intervals the greatest contributions to changes in life expectancy at birth were typically made by the youngest age-group, i.e., 0-29 years, and the smallest changes were attributed to the 65 years and over age-group.

28/ Levels and Trends of Mortality Since 1950, Chapter 2, op. cit

In the later period, from the early 1960s to the early 1970s, the youngest age-group continued to contribute the most to increases in life expectancy among males, but frequently the contributions from the middle and oldest age-groups were either negligible or even negative. Among females during this period, the countries of Southern and Eastern Europe typically had a pattern similar to that of the males, with the largest increases in life expectancy coming from age group 0-29 and the smallest from age-group 65 and over. In the countries outside these regions, however, the most notable feature of the female pattern was the greater contributions of the two older age-groups, particularly the 65 and over group. One conclusion of this analysis was that the widening of the life expectancy gap between the sexes in many of the developed countries in the period from the early 1950s to the early 1970s was mainly due to the greater mortality improvement at the older ages among females.

A similar decomposition analysis has been performed, for slightly different age-groups, on data for the 1970s, to determine the contribution of mortality improvement in these age-groups to increases in life expectancy between 1970 and the late 1970s. The age-groups are: 0-34 years, 35-64 years and 65 years and over. The results are presented in Table 4.8. A diversity of patterns is displayed by these data, but if there is one outstanding feature, it is the large contribution to total change in life expectancy among females arising from mortality decline in the population aged 65 years and over. This pattern is found in almost every country outside Eastern and Southern Europe. In 18 of the countries, the 65 years and over age-group made the greatest contribution to gains in female life expectancy, and in 10 of these countries the contribution was one year or more. It is from the older age-groups that any future substantial gains in female life expectancy at birth will have to come, as mortality among young and middle-aged females in most of the more developed countries is now very low. It has been estimated from mid 1970s data for the more developed countries that if all mortality below age 50 years were eliminated, female life expectancy at birth would be increased by only two to three years.

In most of the Eastern European countries, the greatest contributions to increases in female life expectancy were made by the under 35 year age group. These contributions were very modest in absolute terms, however, and progress in the two older age-groups was virtually at a standstill, or even negative, in several countries. This slowing down has occurred at what are relatively low levels of female life expectancy at birth, some 73 years around 1970.

Table 4.8 Changes in expectation of life at birth and contribution to changes from three broad age-groups, countries in more developed regions, 1970 to late 1970s

(Years)

Region, country and years	Males				Females			
	Change in $\mathring{e}_o$	Contribution to change by age-groups:			Change in $\mathring{e}_o$	Contribution to change by age-groups:		
		0-34	35-64	65 and over		0-34	35-64	65 and over
Northern America								
Canada, 1970 to 1975	0.5	0.3	0.1	0.1	1.2	0.3	0.2	0.7
United States, 1970 to 1976	1.9	0.7	0.8	0.4	2.1	0.5	0.6	1.1
Asia								
East Asia								
Japan, 1970 to 1977	3.4	0.9	1.1	1.4	3.3	0.6	1.0	1.7
Europe								
Eastern Europe								
Bulgaria, 1970 to 1977	-0.9	0.3	-0.7	-0.5	0.1	0.3	0.1	-0.2
Czechoslovakia, 1970 to 1975	0.9	0.6	0.1	0.2	0.5	-0.2	0.3	0.4
German Dem.Rep., 1970 to 1976	0.7	0.3	0.2	0.1	1.1	0.5	0.3	0.3
Hungary, 1970 to 1977	0.2	0.9	-0.7	0.0	0.9	0.7	-0.2	0.4
Poland, 1970 to 1976	0.4	0.7	-0.5	0.2	1.8	0.7	0.1	1.0
Romania, 1970 to 1977	1.4	1.4	-0.2	0.2	1.3	1.3	0.1	-0.1
Northern Europe								
Denmark, 1970 to 1977	0.9	0.6	0.1	0.2	2.0	0.5	0.3	1.2
Finland, 1970 to 1975	1.2	0.3	0.5	0.4	1.8	0.3	0.4	1.1
Ireland, 1970 to 1975	0.4	0.0	0.2	0.1	1.1	0.3	0.5	0.2
Norway, 1970 to 1977	1.2	0.5	0.3	0.4	1.6	0.2	0.2	1.1
Sweden, 1970 to 1977	0.5	0.5	-0.2	0.2	2.0	0.3	0.4	1.3
United Kingdom								
England and Wales, 1970 to 1977	1.3	0.4	0.4	0.4	1.1	0.4	0.2	0.5
Northern Ireland, 1970 to 1977	-0.3	-0.0	-0.1	-0.2	0.3	0.1	0.2	0.0
Scotland, 1970 to 1977	1.1	0.4	0.4	0.3	1.2	0.3	0.3	0.6
Southern Europe								
Italy, 1970 to 1974	1.2	0.7	0.1	0.4	1.6	0.7	0.3	0.6
Malta, 1970 to 1977	1.0	1.2	0.2	-0.4	-0.3	-0.3	0.5	-0.5
Portugal, 1971 to 1975	1.2	0.8	0.1	0.3	2.3	1.3	0.3	0.7
Spain, 1970 to 1975	0.5	0.6	-0.0	-0.1	0.8	0.3	0.3	0.2
Yugoslavia, 1970 to 1976	2.5	1.6	0.4	0.5	2.7	1.7	0.5	0.5

(Table 4.8 continued)

Region, country and years	Males				Females			
	Change in $\overset{o}{e}_o$	Contribution to change by age-groups:			Change in $\overset{o}{e}_o$	Contribution to change by age-groups:		
		0-34	35-64	65 and over		0-34	35-64	65 and over
Europe (continued)								
Western Europe								
Austria, 1970 to 1977	2.1	1.0	0.4	0.7	2.1	0.8	0.4	0.9
Belgium, 1970 to 1976	1.0	0.5	0.4	0.1	1.3	0.4	0.3	0.6
France, 1970 to 1976	0.8	0.4	0.2	0.2	1.3	0.4	0.3	0.6
Germany, Fed. Rep. of, 1970 to 1977	1.9	1.0	0.4	0.6	2.4	0.7	0.5	1.2
Luxembourg, 1971 to 1974	1.1	0.3	0.4	0.4	1.4	1.0	-0.1	0.5
Netherlands, 1970 to 1977	1.3	0.5	0.5	0.2	2.2	0.4	0.3	1.5
Switzerland, 1970 to 1977	2.0	0.7	0.7	0.7	2.8	0.5	0.7	1.6
Oceania								
Australia-New Zealand								
Australia, 1970 to 1977	2.5	0.6	0.9	1.0	2.8	0.6	0.7	1.6
New Zealand, 1970 to 1975	0.7	0.1	0.2	0.3	0.9	0.1	0.3	0.5

Note: The decomposition procedure has been performed on life table values calculated from data on deaths and population by age and sex in the World Health Organization data bank. The 1970 life table values were calculated by the United Nations, while those for the more recent year were calculated by the World Health Organization, and published in World Health Statistics Annual, 1979 (Geneva, 1979), Tables 10 and 11. These values may, therefore, differ from official country life table values.

The formulas used for the decomposition are given in Levels and Trends of Mortality Since 1950 (United Nations publication, forthcoming), Chapter 2, Table II.3

Because of rounding, the sum of the parts may differ from the total.

The patterns in Southern European countries were erratic, but in the two countries with the largest increases in female life expectancy -- Portugal and Yugoslavia -- mortality improvement in the youngest of the three age-groups was responsible for by far the largest portion of the change.

A consistent feature of the pattern of mortality change among males between 1970 and the late 1970s has been the greater contribution of the youngest age-group over that of either of the two older age-groups. This occurred in most of the countries in Table 4.8, and continues earlier trends described above. Notable exceptions were Japan and Australia, where trends were most favourable among the oldest males. Progress was slowest in the 35-64 year age-group, where mortality actually increased in half a dozen countries, four of them in Eastern Europe. Such trends, also, were observed in the 30-64 year age-group in the 1960s. While the contribution to life expectancy gains from the oldest age group can be described for most of the countries as negligible to rather modest, this was a decided improvement over trends in the 1960s, which resulted in a negative contribution from this age-group in many countries. 29/ For males, there is greater potential for mortality gains below the age of 50 years than for females. An estimate for the mid 1970s indicates that life expectancy at birth could be extended by some four to five years if all mortality below the age of 50 years were eliminated.

Infant mortality trends in the more developed countries have generally been very favourable in the 1970s. Figure 4.9 shows the dramatic shift which has taken place between 1970 and the late 1970s in the distribution of infant mortality rates. Rates under 15 per 1,000 live births were recorded in 21 countries at the latter date, compared with only 6 countries in 1970. Of the 21 countries, 7 had rates under 10, and Sweden's was less than 8. Just as the estimates of a population's attainable life expectancy at birth have continued to be revised upward, so the estimates of the lower limits of infant mortality continue to be challenged by experience.

The declines in infant mortality have been so pronounced for many countries that their 1977 or 1978 indexes (1970 equalling 100) are in the 50s and 60s. More than half the countries in Table 4.9 fall into this category. As was the case with expectation of life at birth, substantial declines in infant mortality occurred both in

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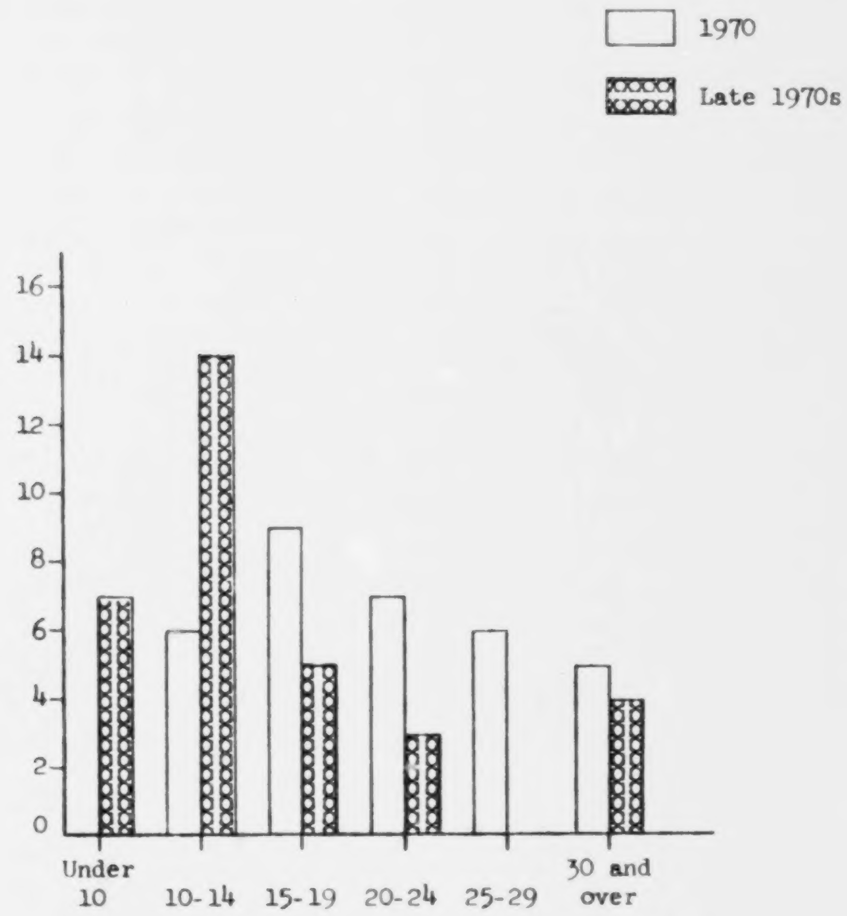
29/ See Levels and Trends of Mortality Since 1950 op. cit., Chapter 2, Table II.3.

Figure 4.9 Frequency distributions of infant mortality rates, 33 countries in more developed regions, 1970 and late 1970s



Infant mortality rate (per 1,000 live births)

Source: Table 4.9.

Table 4.9 Infant mortality rates and indexes of rates, countries in more developed regions, 1970-1978

Region and country	Infant mortality rates (Infant deaths per 1,000 live births)					Index (1970 = 100)				
	1970	1975	1976	1977	1978	1970	1975	1976	1977	1978
Northern America										
Canada	18.8	14.3	13.5	12.4	...	100.0	76.1	71.8	66.0	...
United States	20.0	16.1	15.2	*14.0	...	100.0	80.5	76.0	*70.0	...
Asia										
East Asia										
Japan	13.1	10.0	9.3	8.9	8.4	100.0	76.3	71.0	67.9	64.1
Europe										
Eastern Europe										
Bulgaria	27.3	23.1	23.5	*23.7	22.2	100.0	84.6	86.1	*86.8	81.3
Czechoslovakia	22.1	20.8	21.0	*19.6	18.7	100.0	94.1	95.1	*88.7	*84.6
German Dem. Rep. a/	18.5	15.9	14.0	*13.1	*13.2	100.0	85.9	75.7	*70.8	*71.4
Hungary	35.9	32.8	29.8	26.2	24.4	100.0	91.4	83.0	73.0	68.0
Poland	33.2	24.9	23.8	24.6	*22.4	100.0	75.0	71.7	74.1	*67.5
Romania	49.4	34.7	31.4	31.2	30.3	100.0	70.2	63.6	63.2	61.3
Northern Europe										
Denmark	14.2	10.4	10.2	*8.9	*8.9	100.0	73.2	71.8	*62.7	*62.7
Finland	13.2	9.6	9.9	9.1	...	100.0	72.7	75.0	68.9	...
Ireland	19.5	17.5	*14.6	*15.7	*14.9	100.0	89.7	*74.9	*80.5	*76.4
Norway	12.7	11.1	10.5	9.2	...	100.0	87.4	82.7	72.4	...
Sweden	11.0	8.6	8.3	*8.0	*7.7	100.0	78.2	75.5	*72.7	*70.0
United Kingdom	18.4	16.0	14.5	*14.1	*13.3	100.0	87.0	78.8	*76.6	*72.3
England and Wales	18.1	15.7	14.3	*13.7	*13.2	100.0	86.7	79.0	*75.7	*72.9
Northern Ireland	22.9	20.4	18.3	17.2	*17.2	100.0	89.1	79.9	75.1	*75.1
Scotland	19.6	17.2	14.3	16.1	*12.9	100.0	87.8	75.5	82.1	*65.8
Southern Europe										
Greece	29.6	24.0	22.5	*20.3	19.3	100.0	81.1	76.0	*68.6	65.2
Italy	29.6	21.2	19.5	*17.6	*16.0	100.0	71.6	65.9	*59.5	*54.1
Malta	27.9	17.5	15.0	13.5	*14.4	100.0	62.7	53.8	48.4	*51.6
Portugal	58.0	38.9	...	...	...	100.0	67.1	...	...	...
Spain b/	26.5	18.9	17.1	*15.9	*15.1	100.0	71.3	64.5	*60.0	*57.0
Yugoslavia	55.5	39.7	*37.1	*35.2	*33.6	100.0	71.5	*66.8	*63.4	*60.5

(Table 4.9 continued)

Region and country	Infant mortality rates (Infant deaths per 1,000 live births)					Index (1970 = 100)				
	1970	1975	1976	1977	1978	1970	1975	1976	1977	1978
Europe (continued)										
Western Europe										
Austria	25.9	20.5	18.2	*16.9	*14.9	100.0	79.2	70.3	*65.3	*57.5
Belgium	21.1	16.1	15.3	*11.8	*11.7	100.0	76.3	72.5	*55.9	*55.5
France	18.2	13.8	12.5	*11.4c	*10.6c/	100.0	75.8	68.7	*62.6	*58.2
Germany, Fed. Rep. of a/	23.6	19.8	17.4	15.5	14.7	100.0	83.9	73.7	65.7	62.3
Luxembourg	24.6	13.5	17.9	10.6	10.6	100.0	54.9	72.8	43.1	43.1
Netherlands	12.1	10.6	10.7	9.5	*9.5	100.0	87.6	88.4	78.5	*78.5
Switzerland	15.1	10.7	10.7	9.8	8.6	100.0	70.9	70.9	64.9	57.0
Oceania										
Australia-New Zealand										
Australia	17.9	14.3	13.8	12.5	...	100.0	79.9	77.1	69.8	...
New Zealand	16.7	16.0	14.0	14.2	13.8	100.0	95.8	83.8	85.0	82.6
USSR d	24.7	29.4e/	31.1e	...	...	100.0	119.0	125.9	...	...

Sources: Unless otherwise indicated, Demographic Yearbook 1978 (United Nations publication, Sales No. E/F.79.XIII.1), Table 15; Historical Supplement to ibid. (forthcoming); and Population and Vital Statistics Report; Data Available as of 1 April 1980 (United Nations publication, Sales No. ST/ESA/STAT/SER.A/132).

... Data not available.

* Provisional.

a/ The data which relate to the Federal Republic of Germany and the German Democratic Republic include the relevant data relating to Berlin, for which separate data have not been supplied. This is without prejudice to any question of status which may be involved.

b/ Spain, Instituto Nacional de Estadística, Anuario Estadístico de España 1979 (Madrid, 1980?), p.70.

c/ Excludes live-born infants dying before registration of birth.

d/ Rates given in Christopher Davis and Murray Feshbach, Rising Infant Mortality in the U.S.S.R. in the 1970's, United States, Bureau of the Census, Series P-95, No. 74 (Washington, D.C., 1980), p. 2.

e/ Estimated by assuming the same relationship that existed from 1962 to 1974 between the infant mortality rate (for which official data have not been published since 1974) and the death rates for ages 0-4 years. For those years, the death rate at ages 0-4 years has been 27 to 29 per cent of the infant mortality rate; this percentage was used in estimating the 1975 and 1976 rates. See ibid., pp. 3-4.

countries with high initial rates (e.g., Romania and Yugoslavia) and those with relatively low rates (e.g., Japan, Denmark and Finland).

Despite the rapid overall progress made in reducing infant mortality in the 1970s, however, there was still a four-fold difference between the highest and lowest rates in 1978. Rates in excess of 30 persisted in Portugal, Romania and Yugoslavia. In the USSR infant mortality was estimated to have increased from 25 to over 30 between 1970 and 1976.

Chapter 5

POPULATION STRUCTURE

Population size and growth rate are basic elements to be taken into account in development planning. Also of critical importance is the structure of the population because subgroups of population such as children, work force, elderly people, women, ethnic and religious groups, have unique problems and require special attention. In this chapter, however, discussion will be limited to the age structure of the population which is determined by preceding levels and trends of fertility and mortality and, in some instances, immigration and emigration.

One of the most important trends in the age structure of population today is the aging of populations characterized by a relative decrease of the younger population accompanied by a relative increase of the older population. The aging of populations, which has long been recognized as a phenomenon in the developed countries, has apparently begun to emerge in the 1970s on a worldwide basis. During the 1950s and 1960s, the age structure of populations in the less developed regions as a whole was becoming slightly younger due to persistently high, if not rising, fertility rates and declining infant and child mortality rates. However, the fertility decline which began in many parts of the less developed regions during the late 1960s has reversed the former trend and tended to make the population structure older. This new trend appears likely to accelerate in the coming decades.

The aging of populations is a demographic process in which the size of the older population increases relative to that of the younger population. When mortality begins to decline from a previously high level it has the effect of imparting a somewhat younger age distribution to the population (when controlled for fertility). This effect occurs because disproportionate gains in survival rates are usually made at the very young ages. After a medium-to-low mortality regime has been in effect for some period, however, further declines in mortality will result in an older age structure of the population. In reality, however, as mortality in a country approaches a low level, it is likely that fertility will also be declining moderately, or even rapidly, and this decline produces a more significant effect on the age structure than that resulting from decreasing mortality. At this stage, both fertility and mortality changes combine to produce an older age structure.

The changing age structure of a population can be shown, for instance, by tracing trends in the median age. It is the median age which divides the population into two equal parts: one older and the other younger. The median age of all the world's population decreased from 23.3 years in 1950 to 21.7 years in 1970, apparently due to the reduction of infant and child mortality rates among the less developed regions. Since that time this figure has been increasing. The average median age for the world is estimated to be 22.6 years in 1980 and is projected by the United Nations to increase to 25.3 years by 2000 (see table 5.1).

Table 5.1. Median age of population for the world, the more developed regions and the less developed regions, 1950-2000

Year	World	More developed regions a/	Less developed regions b/
1950	23.3	28.2	21.1
1960	22.6	29.2	19.9
1970	21.7	30.2	19.1
1980	22.6	31.4	20.0
1990	23.9	33.5	21.5
2000	25.3	35.7	23.2

Source: Selected Demographic Indicators by Country, 1950-2000: Demographic estimates and projections as assessed in 1978 (United Nations publication, ST/ESA/SER.R/38).

a/ "More developed regions" include "Northern America", "Japan", "Eastern, Northern, Southern and Western Europe", "Australia/New Zealand" and "Union of Soviet Socialist Republics".

b/ "Less developed regions" include all regions other than the above.

As to be expected from the diversity of demographic trends among countries and regions of the world, there are large differences in the median age attained by various countries and regions. According to United Nations estimates for 1980, the Federal Republic of Germany has the highest median age, 36.7 years, followed by Sweden with 36.3 years. In contrast some African countries have very low median ages, such as 16.2 years in Liberia and 16.3 years in Nigeria. When all the countries of the world are grouped into two categories, i.e. the more developed and less developed regions, their median ages in 1980 are 31.4 and 20.0 years respectively. In the more developed regions, the average median age has been rising continuously since 1950 when it was 28.2 years. On the other hand, among the less developed regions the average median age decreased from 21.1 years in 1950 to 19.1 years in 1970; however, the trend was reversed thereafter.

The aging of populations which began during the 1970s in the less developed regions, however, is not likely to narrow the gap between the median age of the more developed and less developed regions in the near future because the aging process is advancing more rapidly in the former regions. The difference in the median age between the two regions has increased continuously from 7.1 years in 1950 to 11.4 years in 1980 and is projected to increase further to 12.5 years in 2000.

One way to visualize the process of aging in a population structure is through graphs as in figure 5.1, where the current and future compositions of population by age and sex are illustrated through a series of population pyramids for the more developed and the less developed regions separately. In comparison with the latter, the population pyramid of the more developed regions has a bell-shape at present and will approach a rectangular shape in the future. This means that population in these regions will approximate more closely a stationary state in about a half century when more or less constant numbers of births will be matched by nearly equal numbers of deaths which will occur at advanced ages. In contrast the current population pyramid for the less developed regions looks like a triangle, spreading out at the base like an unfolded fan. Such a pattern implies a rapidly growing population. However, the shape of the pyramid will gradually be transformed into a bell-shape in the future as the aging process proceeds due to a projected fertility decline. By 2025, the pyramid will begin to look like those of the more developed regions today.

As mentioned before, the aging of a population has two aspects: the relative decrease of children and young persons and the relative increase of the elderly population. In the more developed regions the proportion of population aged 0-14 dropped from 29 per cent in 1960 to 23 per cent in 1980 (see table 5.2). This happened because of the fertility decline following the postwar baby boom and the young population subsequently increased very slowly in the 1960s and even decreased in the 1970s. In the coming 20 years, the growth rate of population aged 0-14 years is not expected to exceed 0.3 per cent per annum in the more developed regions while the total population is projected to increase at an annual rate of more than 0.5 per cent. By

Figure 5.1. Population pyramids for the more developed and the less developed regions in 1980, 2000 and 2025

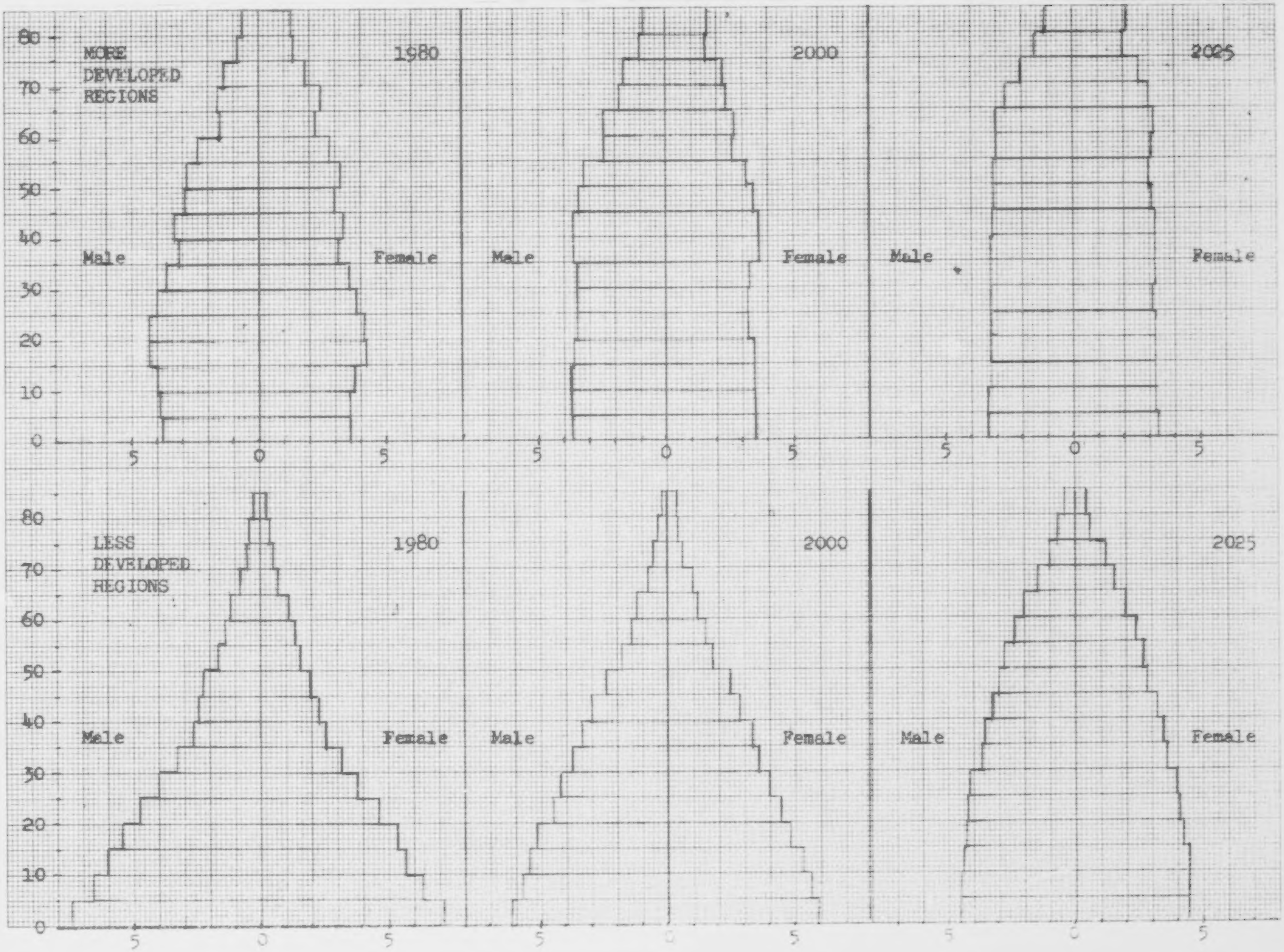


Table 5.2. Structure of population by broad age groups for the world, the more developed and the less developed regions, 1950-2000

Year	World			More developed regions[a]			Less developed regions[a]		
	0-14	15-64	65+	0-14	15-64	65+	0-14	15-64	65+
	Population (million)								
1950	872	1513	128	231	537	64	641	976	64
1960	1122	1747	158	270	595	80	852	1152	78
1970	1372	2105	200	289	658	102	1093	1436	98
1980	1546	2611	258	260	742	129	1286	1870	129
1990	1767	3197	312	265	799	142	1502	2398	170
2000	1958	3846	396	274	831	167	1684	3014	229
	Percentage distribution[b]								
1950	34.7	60.2	5.1	27.8	64.6	7.6	38.1	58.1	3.8
1960	37.1	57.7	5.2	28.6	62.9	8.5	40.9	55.3	3.7
1970	37.3	57.2	5.4	26.5	63.8	9.7	41.6	54.6	3.7
1980	35.1	59.1	5.8	23.0	65.6	11.4	39.1	56.9	3.9
1990	33.5	60.6	5.9	21.9	66.3	11.8	36.9	58.9	4.2
2000	31.6	62.0	6.4	21.5	65.3	13.1	34.2	61.2	4.6

Source: Selected Demographic Indicators by Country, 1950-2000: Demographic estimates and projections as assessed in 1978 (United Nations publication, ST/ESA/SER.R/38).

a/ For coverage of "more developed regions" and "less developed regions", see table 5.1.

b/ Percentage distribution of total population by age groups.

the year 2000, the proportion of population aged 0-14 in the more developed regions is projected to decrease to 22 per cent.

On the other hand, the elderly population aged 65 and over in the more developed regions, which accounts for 11 per cent of the total population in 1980, has been increasing at an average annual rate of around 2.3 per cent in the past 30 years. During this period the growth rate of the total population did not exceed 1.3 per cent. The rate of increase of the elderly population, however, is projected to slow down to 1.0 per cent in the 1980s and then go up to 1.6 per cent in the 1990s, due to the peculiar age structure apparently caused by the losses in World War II. The percentage of total population in age group 65 and over in the more developed regions will thus increase from 9 per cent in 1960 to 11 per cent in 1980 and 13 per cent in the year 2000.

In the less developed regions, the proportion of the population in age group 0-14 declined only slightly in the 1970s from 42 per cent in 1970 to 39 per cent in 1980. By the year 2000 the proportion is projected to drop to 34 per cent. This decline has been caused mainly by the reduction of fertility which reduced the growth rate of the young population from 2.5 per cent in the 1960s to 1.6 per cent per annum in the 1970s. The proportion of the elderly aged 65 and over in the less developed regions is still relatively small, estimated to be 4 per cent of the total in 1980. But the rate of growth of elderly persons which was 2.7 per cent per annum in the 1970s will continue to increase in the near future, not only exceeding the growth rate of the population aged 0-14 in the less developed regions but also the comparable growth rate of the elderly population in the more developed regions. This projection highlights the potential importance of the aging problem in the less developed region.

As to the working age population, the more developed and the less developed regions are facing serious but contrasting problems in the coming years. In the more developed regions, the previous fertility decline will manifest itself in a rapidly declining growth rate of the working age population in the near future. During the decade of the 1970s, that portion of the population grew at an average annual rate of 1.2 per cent. The rate, however, is projected to decrease to 0.7 per cent in the 1980s and 0.4 per cent in the 1990s. In terms of actual numbers, the average annual increase will drop from 8 million in the 1970s to 6 million in the 1980s and to 3 million in the 1990s.

In the less developed regions, the growth rate of the working age population in the coming decades is projected to decline only slightly from 2.6 per cent per annum in the 1970s to 2.5 per cent in the 1980s and 2.3 per cent in the 1990s, indicating the likelihood of a continuing serious employment problem. The size of the annual increase will grow in the coming decades, reaching 53 million, up from 43 million in the 1970s.

One of the indicators used to measure the economic implications of a changing age structure is the dependency ratio. The childhood dependency ratio is defined as the ratio of the population aged 0 to 14 to those aged 15-64, multiplied by 100. The old age dependency ratio is defined as the ratio of the population aged 65 and over to those aged 15 to 64, multiplied by 100. The total dependency ratio is defined as the sum of childhood and old age dependency ratios.

Table 5.3 shows total, childhood and old age ratios for the world as a whole and for the developed and developing regions separately. The total dependency ratio in 1970 was higher in the developing regions due to the fact that the childhood dependency ratio was 69 in the developing and 35 in the developed regions. This greatly outweighed the fact that the old age dependency ratio was 7 in the developing and 17 in the developed regions in 1980.

In the 1970s, due to the rising median age of the population, the dependency ratio began to decrease on a worldwide basis. The average ratio for the world rose from 66 in 1950 to 75 in 1970 and then declined to 69 by 1980. It is projected to fall to 61 by 2000. The expected future decline in the total dependency ratio is primarily due to the projected rapid decline in the childhood dependency ratio in the less developed regions, from 69 in 1980 to 65 in 2000. This decline would certainly help to reduce the economic burden on the working age population in the less developed regions, but the ratio, 56, is still much higher than the 33 which is projected for the same year for the more developed regions. On the other hand, the old age dependency ratio in the less developed regions is projected to increase slightly from 7 to 8 in the coming 20 years.

In the more developed regions, the old age dependency ratio is projected to increase from 17 in 1980 to 20 in 2000. But, as the child dependency ratio is projected to decline from 35 to 33 in the same period, the total dependency ratio in the more developed regions will probably stay at more or less the present level.

Table 5.3. **Age dependency ratios for the world, more developed regi9ons and less developed regions, 1-50-2000**

Year	World			More developed regions a/			Less developed regions a/		
	Total b/	Child-hood c/	Old age d/	Total	Child-hood	Old age	Total	Child hood	Old age
1950	66	58	8	55	43	12	72	66	7
1960	73	64	9	59	45	13	81	74	7
1970	75	65	10	59	44	16	83	76	7
1980	69	59	10	52	35	17	76	69	7
1990	65	55	10	51	33	18	70	63	7
2000	61	51	10	53	33	20	63	56	8

Source: Selected Demographic Indicators by Country, 1950-2000: Demographic estimates and projections as assessed in 1978 (United Nations publication, ST/ESA/SER.R/38).

a/ For coverage of "more developed regions" and "less developed regions", see table 5.1.

b/ Total dependency ratio is defined as the sum of the childhood dependency ratio and the old age dependency ratio.

c/ Childhood dependency ratio is defined as the ratio of the population aged 0-14 to those aged 15-64, multiplied by 100.

d/ Old age dependency ratio is defined as the ratio of the population aged 65 and over to those aged 15-64, multiplied by 100.

Chapter 6

INTERNATIONAL MIGRATION

Introduction

The patterns of international migration which emerged around the middle of the 1970's have largely persisted during the past two years. Substantial stocks of migrant workers have built up in the resource rich countries of the Middle East and North Africa, chiefly from other countries within the region but with increasing numbers coming from other regions and especially from Southern and Eastern Asia. International migration in Europe appears to be continuing its period of relative stabilization following the growth of large stocks of migrant workers during the preceding decade and a half. In North America and Oceania, levels of long-term immigration for resettlement have remained steady but with increasing proportions of the migrant flows coming from the less developed regions. Existing data give no indication of significant changes in patterns or levels of flows in Latin America or in Africa South of the Sahara.

In addition to flows of migrants admitted for permanent resettlement and migrant workers, the issue of undocumented migration remains a matter of serious concern, particularly for countries with substantial net immigration. However, the problem of obtaining more accurate demographic data on these flows continues unresolved. Flows of highly trained professionals into the countries which have been the traditional beneficiaries of the brain drain appear not to have changed very much and may have abated slightly. On the other hand, reports are widespread of difficulties in many net sending countries resulting from shortages of technical and skilled workers and trained craftsmen who have joined the labour migration flows, especially into the Middle East and North Africa. Finally, during the past two years there have been several substantial new flows of refugees in various parts of the world.

The obtaining of timely and accurate demographic data on international migration remains a difficult problem. In all but quite highly developed countries, the periodic census remains the chief source of information. Estimates of flows both into and out of a given country are not commonly available from direct observation, not always even in countries with highly developed statistical systems; the data that do exist normally require very careful appraisal before they can be used. Measures to obtain improved statistics on international migration remain a matter of considerable urgency.

In the following report, attention is focussed on three issues in international migration of immediate concern: labour migration into resource-rich countries of the Middle East and North Africa, labour migration in Europe and refugees. These are, of course, by no means the only issues of major concern. They were selected for this monitoring report since some of the other topics have been covered more fully in previous monitoring reports and for still others there are no significant new sources of data.

North Africa and the Middle East

Massive levels of international migration, in relation to the size of the national populations of the host countries, are among the most important of the many profound social and economic changes that have occurred in North Africa and the Middle East since the sharp rise in petroleum prices began in 1973. The speed with which the stocks of migrants have built up has added significantly to the impact on both net sending and receiving countries. The size and speed of the development of such flows has strained the abilities of the national statistical systems to measure them accurately and with sufficient detail.

The most recent date for which there are complete estimates of stocks of migrants for the countries of North Africa and the Middle East is 1975. Even for that date, the estimates continue to have to be revised slightly as further studies are done and as more data are made available and analyzed.

Results of a very recent set of estimates for countries in the Arab region 1/ are shown in Tables 6.1 and 6.2. 2/ They indicate that there

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1/ J. S. Birks and C. A. Sinclair, International Migration and Development in the Arab Region. ILO, Geneva, 1980, and a large number of supporting reports and working papers, all published under the auspices of ILO's World Employment Programme.

2/ These estimates of numbers of migrant workers differ slightly from those used by other authors who have dealt with this subject. In the aggregate, differences tend to be small but specific numbers from a particular country of origin to a particular country of destination are sometimes considerable. These discrepancies reflect the difficulties with which such estimates are made. The Birks and Sinclair estimates are used here chiefly because they are consistent with other information to be discussed below. For another recent set of estimates see, for example E. Ecevit, "Labor Imports/Exports for Economic Development - the Middle East Experience," a paper presented to the Sixth World Congress on Human Resources, Employment and Development. Mexico City, August, 1980. The aggregate difference for the same set of countries between Birks/Sinclair and Ecevit is .056.

Table 6.1 **Migrant workers in the Arab region by country of employment and region of origin, 1975**
(thousands)

Country of employment	Country or region of origin																				Total
	Egypt	Yemen	Jordan Palestine	Demo-cratic Yemen	Syrian Arab Republic	Lebanon	Sudan	Maghreb	Oman	Iraq	Somalia	All Arab	Pakistan	India	Other Asians	All Asians	Europe and America	Africa and other	Turkey	Iran	
Saudi Arabia	95.0	280.4	175.0	55.0	15.0	20.0	35.0	-	17.5	2.0	5.0	699.9	15.0	15.0	8.0	38.0	15.0	10.0	.5	10.0	773.9
Libyan Arab Jamahiriya	229.5	-	14.2	-	13.0	5.7	7.0	41.0	-	-	-	310.4	4.5	.5	.5	5.5	7.0	.5	9.0	-	332.3
United Arab Emirates	12.5	4.5	14.5	4.5	4.5	4.5	1.5	-	14.0	.5	1.0	62.0	100.0	61.5	2.0	163.5	5.0	-	-	21.0	251.5
Kuwait	37.6	2.8	47.6	8.7	16.6	7.2	.9	-	3.7	18.0	.2	143.3	11.0	21.4	1.1	33.6	2.0	.1	-	28.9	208.0
Qatar	2.8	1.2	6.0	1.2	.8	.5	.4	-	1.9	-	-	14.8	16.0	16.0	2.0	34.0	.8	-	-	4.0	53.7
Bahrain	1.2	1.1	.6	1.1	.1	.1	.4	-	1.4	.1	-	6.1	6.7	8.9	.9	16.6	4.4	-	-	1.9	29.3
Jordan (East Bank)	5.3	-	-	-	20.0	7.5	-	-	-	-	-	32.8	-	-	-	-	.1	-	-	-	32.9
Oman	4.6	.1	1.6	.1	.4	1.1	.5	.1	-	-	.3	8.8	32.5	26.0	.2	58.7	2.8	-	-	.4	70.7
Yemen	2.0	-	.2	-	.2	-	-	-	-	-	-	2.4	-	-	-	-	.1	-	-	-	2.5
Iraq	7.0	-	5.0	-	-	3.0	.2	-	-	-	-	15.2	5.0	5.0	-	10.0	.5	-	-	40.0	65.7
Total	397.5	290.1	264.7	70.6	70.6	49.6	45.9	41.1	38.5	20.6	6.5	1 297.7	190.7	154.3	14.7	359.9	37.7	10.6	9.5	106.2	1 820.5

- no migrants from this country or area of origin reported.

Source: J.S. Birks and C.A. Sinclair, International Migration and Development in The Arab Region, ILO, Geneva, 1980.

Table 6.2. **Migrant populations** in the Arab region by country of residence and country or area of origin, 1975
(thousands)

Country of residence	Country or area of origin																				Total
	Egypt	Yemen	Jordan Palestine	Demo-cratic Yemen	Syrian Arab Republic	Lebanon	Sudan	Maghreb	Oman	Iraq	Somalia	All Arab	Pakistan	India	Other Asians	All Asians	Europe America	Africa and other	Turkey	Iran	
Saudi Arabia	201.3	322.2	536.8	153.4	45.5	37.9	71.8	-	41.0	5.0	8.0	1 420.9	47.8	34.5	11.5	93.8	22.7	14.5	.62	12.5	1 565.0
Libyan Arab Jamahiriya	327.5	-	35.4	-	57.8	14.2	14.0	38.5	-		-	487.4	12.8	1.1	.7	14.6	17.5	.7	11.2	-	531.5
United Arab Emirates	21.0	5.6	36.5	8.5	11.3	11.3	2.5	-	21.2	.8	1.5	120.2	201.8	107.5	2.1	311.4	9.5	-	-	15.0	456.0
Kuwait	60.5	4.8	204.2	12.3	41.0	24.8	1.6	.3	7.3	45.1	.6	402.4	23.0	32.1	1.0	56.1	2.5	.5	.1	40.8	502.5
Qatar	4.0	1.9	17.0	1.7	1.9	1.3	.8	-	3.2	-	-	31.8	28.0	27.8	2.4	58.2	1.8	-	-	5.2	97.0
Bahrain	3.3	2.0	2.5	1.8	.2	.3	.1	-	1.7	.3	-	12.2	17.8	17.2	1.5	36.5	3.3	1.0	-	4.0	56.0
Jordan (East Bank)	5.9	-	-	-	22.0	22.0	-	-	-	-	-	49.9	-	-	-	-	.2	-	-	-	50.2
Oman	9.8	.2	4.9	.2	1.1	3.2	1.0	.2	-	-	.5	21.0	65.0	38.5	.2	103.8	7.0	-	-	.5	132.2
Yemen	4.2	-	.6	-	.4	-	-	-	-	-	-	5.2	-	-	-	-	.2	-	-	-	5.4
Iraq	17.5	-	15.3	-	-	.7	.4	-	-	-	-	33.9	10.0	7.5	-	17.5	.7	-	-	50.0	102.1
Total	655.1	336.7	853.2	177.9	159.2	115.7	92.1	59.0	74.4	51.1	10.6	2 584.9	406.2	266.2	19.4	691.9	65.4	15.8	12.0	128.1	3 497.9

- no migrants from this country or area of origin reported.

Source: J.S. Birks and C.A. Sinclair, op cit.

were some 1.8 million migrant workers in countries of that region in 1975. The two most important receiving countries were Saudi Arabia and the Libyan Arab Jamahiriya, which together contained over half the total stock in the region. Substantial numbers were also found in the United Arab Emirates and Kuwait. In 1975, the majority of all migrant workers had come from other Arab countries, particularly Egypt, Jordan, the Yemen Arab Republic and the People's Democratic Republic of the Yemen. Saudi Arabia and the Libyan Arab Jamahiriya depended almost entirely on other Arab countries as the sources for their migrant flows while the United Arab Emirates, Qatar, Bahrain and, to a lesser degree, Kuwait had already begun to attract substantial proportions of their migrants from selected non-Arab countries of Asia and elsewhere.

A noteworthy feature of the migration flows into this region may be observed by comparing the estimates of numbers of workers, in Table 6.1, with the total numbers of migrants, in Table 6.2. A widespread view has been that the flows of migrants into the Middle Eastern countries have consisted almost entirely of workers travelling alone. The comparison demonstrates, however, that such is not the case. Along with the approximately 1.8 million migrant workers, there were in 1975 approximately 1.6 million additional persons who had migrated into the region but had not entered the labour force. Since unemployment levels in the region are generally very low, at least a significant proportion of these non-working entrants are likely to be dependents of migrant workers. (Some other factors may also be involved; it is quite likely that in all of the receiving countries, some individuals who enter as dependents subsequently accept employment, but do not report it. Others presumably are international migrants whose moves are unrelated to the labour migration flows: pilgrims, students, spouses, and so on. Nevertheless, the dependents or workers are almost certainly the major component of the flow.)

The proportions of migrants employed do not vary a great deal by region of origin. Among migrants from other Arab countries, the proportion is almost exactly .5. However, there are comparatively large variations in the proportions employed by individual country of origin. Yemenis and Egyptians have comparatively high proportions employed, .86 and .61 respectively, whereas migrants of Jordanian-Palestinian origin and those from Democratic Yemen are much less likely to be employed, the proportions are .31 and .40,respectively. Corresponding proportions for other Arab countries with substantial numbers of emigrants are between .40 and .60. Of all non-Arab Asian migrants, .52 are employed. However, there are some differences among the various groups of migrants of Asian origin. Among Pakistani migrants a minority (.47) are workers while among Indians the proportion is .58. Among the less numerous and more recently arrived migrants from other countries in

Asia, just over three-fourths are employed. This markedly higher proportion probably reflects the fact that the development of the migration flow from East and South East Asia is still at an earlier phase and also the greater tendency for these flows to be organized through contractual agreements between the host country and an agency of the sending country or a trans-national corporation, for work on a specific project. The corresponding proportion for migrants from Europe and America is .58, the same as that for India.

Between the various host countries, the variations in proportions of all immigrants who are employed are only moderate. It is higher in the Libyan Arab Jamahiriya, .62, near the aggregate average in the United Arab Emirates and in Saudi Arabia, .55 and .49 respectively, and lower in Kuwait, .41. It is noteworthy that these ratios of foreign workers to total migrants are not markedly different from those recently observed in Europe. For six of the leading countries of net labour immigration (Belgium, France, FRG, Netherlands, Sweden, Switzerland) the ratio is .47, with a range from .36 (Belgium) to .54 (Switzerland).

The presence of these substantial numbers of dependents in the migrant flows into the net immigration countries of the Middle East and North Africa cannot but have profound social and economic consequences, for both sending and receiving countries. However, precisely what the long-term demographic and other consequences might be, apart from the sheer numbers involved, is not all that obvious. In particular, although it might seem plausible to assume that worker migrants who are accompanied by dependents are more likely to stay for a longer time or to attempt to settle permanently, that may not be the case. The recent European experience with migrant workers and dependents suggests that the relationship between the proportion of migrants who are dependents and the likelihood and timing of their eventual return to country of origin is quite complex.

Generally migrants from a given country of origin distribute themselves in a way which is neither equal nor proportional to the distribution of all migrants among receiving countries. Rather, there are distinct paths between specific pairs of countries. For example, as of 1975, Saudi Arabia attracted less than one third of all Egyptian migrants but over .95 of all those from the Yemen, three-fifths from Jordan-Palestine and some .86 of all emigrants from Democratic Yemen. Other specific pairs of countries are similarly linked by disproportionately large or small flows, as the case may be. Propinquity is a major factor, but it is probably decreasing in importance over time, especially with larger numbers of migrants coming from outside the region.

The most striking feature of migration in this region, from virtually every point of view, is the sheer size of the migrant stocks relative to the size of the national populations of most of the chief receiving countries. (Iraq and Iran, with over 100,000 immigrants in their populations as of 1975, were also among the leading receiving countries of the region. However, their very large native born populations - 11 and 33 million, respectively - made the relative impact of migrants comparatively slight). As can be seen in Table 6.3, the proportion of the resident population which is foreign is one fifth or more in each of the leading countries of immigration, and it rises to one half or more in the United Arab Emirates, Qatar and Kuwait. Indeed, in the United Arab Emirates, nationals are outnumbered by more than two to one. Even higher proportions of immigrants are observed in the labour force of these selected countries. In Qatar and the United Arab Emirates more than four fifths of the respective labour forces are of foreign origin. In every case, more than one third of the labour force are immigrants.

The numbers of migrants relative to the populations of the countries of their origin among the countries of the Middle East and North Africa are generally lower, but are nonetheless significant. Several of the leading countries of emigration have quite large populations; Egypt, Sudan, Syria and Yemen, which together provided over one-third of all migrants into the receiving countries of the region, each had a national population of more than five million in 1975. For other countries the outflows were relatively large. The number of persons identified by Birks and Sinclair on the basis of their field studies as Jordanians/Palestinians is equivalent to just slightly less than one third the total population of Jordan. Yemen and Democratic Yemen each also appear to have over five percent of their population outside their national boundaries as participants in the intra-regional migration flows. For all other countries of the region, intra-regional emigration appears to have been equivalent to less than four percent of their total population. It must also be noted that a number of countries of the region have experienced net emigration to other regions of the world, especially to Europe and the Americas. Egypt, Lebanon, Jordan, Syria and Iraq have all participated in these flows.3/

Information for the years following 1975 is not complete. However, indirect evidence such as numbers of work permits issued by some countries, remittances reported, and so forth, is sufficient to support three important observations. First, the stocks of immigrants, workers and others, in North Africa and the Middle East have continued to increase. There has almost certainly been a decline in Iran, with the departure of an estimated 85,000 migrants from Europe and North America and a majority of the 120,000 workers from Afghanistan who were reported in the country in 1975. However, in all of the other net immigration

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3/ The most recent general summary of these global flows remains United Nations *Trends and characteristics of international migration since 1950*. ST/ESA/SER.A/64.

Table 6.3. Total and immigrant population and labour force in selected Arab countries of net immigration, 1975 (thousands).

	Population			Labour force		
	Total	Immigrant	Proportion	Total	Immigrant	Proportion
Saudi Arabia	7,180	1,565.0	.22	1,799.9	773.4	.43
Libyan Arab Jamahiriya	2,430	531.5	.22	783.6	334.4	.42
United Arab Emirates	558	456.0	.82	296.5	251.5	.85
Kuwait	1,002	502.5	.50	299.8	208.0	.69
Qatar	170	97.0	.57	66.2	53.7	.81
Bahrain	256	56.0	.22	75.8	30.0	.40
Oman	766	132.2	.17	207.7	70.7	.34

Source: Birks and Sinclair, op. cit.; The United Nations, Demographic Yearbook, 1978.

countries, indications are that the number of migrants has continued to increase. In particular, Iraq and Algeria, with large national populations, were able to meet a large part of their labour force needs with comparatively little immigration up to about 1976. Since that time, labour imports have accelerated. For example, the number of foreign workers recruited by Algeria rose from 9.8 thousand in 1975 to 21.4 thousand in 1977. 4/

A second observation is that increasing numbers of migrants were drawn from countries of South East and East Asia. Tables 6.1 and 6.2 show that about one fourth of all immigrants in 1975 were from Asian countries outside the West Asia region. The United Arab Emirates, Oman, Qatar, Bahrain and Iraq each drew a half or more of all immigrants from these countries. The great majority were from just three of the countries, Iran, Pakistan and India. Following 1975, India and Pakistan have continued to be major participants in the migration flows to the Middle East and North Africa. In addition, however, a number of countries further south and east began to participate. Workers at virtually all skill levels from highly trained professionals and managers to clerks, craftsmen and construction workers participate. Leading countries of origin in this newer flow include the Republic of Korea, the Philippines, Malaysia, Thailand, Sri Lanka and Bangladesh. Nearly all of the net receiving countries have begun to draw migrants from the Southern and Eastern Asian countries, probably reflecting above all else that the pools of potential migrants within the requisite skills in the net sending countries of the Arab world, are being exhausted.

There are reports of serious labour shortages in some of the sending countries such as Egypt, Jordan and Yemen. As can be observed in Table 6.1, by 1975 Jordan had itself begun to depend in part on migrant workers. Serious labour shortages in Yemen are reported to have led to actual declines in agricultural output and to land under cultivation since 1975. Two exceptions to this growing dependence on Asian sources, one in the Libyan Arab Jamahiriya, which apart from Arab world sources has continued to draw more heavily from Europe, North America and Turkey.5/ The other is Iraq, which attracted nearly two thirds of its migrant labour force from Iran.

The third observation is that the governments of the net receiving countries are in general attempting to exercise increased control over the size and characteristics of the migrant flows. Regulations have been strengthened and more rigorously implemented. Increased use is made of formal arrangements between sending and receiving countries.

4/ Ecevit, *op. cit.*, p. 5.

5/ Recent newspaper accounts suggest that the Libyan Arab Jamahiriya has since 1977 reduced the numbers of foreign workers overall and sharply reduced

Two important considerations give rise to this trend. First, the receiving countries are concerned that the very large numbers of immigrants within their borders, an unknown but significant proportion of whom had entered without the permission of the host country, could become a threat to political stability. Second, as development has proceeded in the region, labour force requirements have begun to shift from a situation where workers at all skill levels were needed, including large amounts of unskilled labour, to one where the needs are becoming more specialized. To fill these specialized needs, the countries of immigration have had to go further afield into other regions and to recruit in a more selective fashion.

There has been a good deal of discussion and some controversy over the social and economic consequences of labour migration. Among the benefits for sending countries, reduction of unemployment and resulting social tensions, acquisition of occupational skills and values which can be put to use by returned migrants and remittances in money and kind have been mentioned. In particular, worker remittance flows have become a very important source of foreign exchange for many sending countries. Table 6.4 reports recent estimates of worker remittances received in selected countries with migrant flows into countries of the Middle East and North Africa. It is obvious that very substantial capital flows are involved, to the extent that for some countries worker remittances are a leading factor in the country's international balance of payments. (Moreover, it should be recognized that actual values remitted were quite probably in every case higher than the amounts reported, since the figures given do not include funds transferred informally and the value of goods purchased abroad and brought back to the country of origin). In addition, table 6.4 reflects the rapid increase in the importance of migration from countries of South Asia. During the two-year interval from 1975 to 1977 remittances to Pakistan and Bangladesh increased by factors of about 3 and 5 respectively. For India, the increase was some 50 percent in one year from 1975 to 1976.

For 1975, the available data indicate that the average annual remittance per migrant worker for these countries, excluding Sudan, was just slightly less than (US) $1,350. Remittances per worker ranged from $630 (Jordan) to $2,680 (India). The comparatively low estimate for Jordan probably reflects in part a much lower proportion of workers in the flow of migrants from Jordan. There is no readily apparent explanation for the very low figure ($39) for annual remittances per migrant worker from the Sudan.

Table 6.4. Net worker remittances for selected countries with significant migrant flows into the Middle East and North Africa, and years.

Country	Net worker remittances (million US dollars)					
	Year				As percentage of total exports	
	1970	1975	1976	1977	1970	1977
Egypt	29.0	365.5	755.1	896.7	3.0	25.4
Jordan	15.5	166.6	411.0	419.1	17.4	62.2
Yemen	-	309.7	796.3	914.3	-	799.1
Sudan	-	1.8	9.5	36.8	-	4.7
Pakistan	-	275.6	409.9	866.3	-	60.6
India	95.0	414.0	615.5	-	4.3	9.5 (a)
Bangladesh	-	15.3	18.1	78.3	-	14.5

(a) 1976.

Source: International Bank for Reconstruction and Development. World Tables, 2nd Ed. (1980). Published for the World Bank by Johns Hopkins University Press, Baltimore 1980.

Benefits to the countries of immigration include, above all else, alleviation of labour shortages. Given the small national populations of most of the resource rich countries of the Middle East and North Africa as well as, in most cases, their previously low educational levels, economic growth anywhere near the actual level would have been virtually impossible without large-scale immigration. In addition, it has been observed that migrant workers are often willing to accept lower wages, poorer working conditions and less desirable occupations, thus helping to hold down costs of production. Finally, it has been argued that workers make fewer demands as dependent members of the host society: they normally arrive as young adults and are expected to remain only as long as they are likely to be employed. Thus, the overall burden of dependency for the receiving society is reduced.

However, significant costs have also been found. For the countries of origin, there may be difficulties from the loss of needed skilled workers; it is not only the unemployed who emigrate. Moreover, skills acquired by migrant workers may have little relationship to labour force needs in the sending country. The use to which remittances have been put were not always very beneficial. In the experience of many countries, substantial amounts are spent on consumer goods and personal residences rather than on the development of productive capacity. Labour shortages in particular sectors or skill categories may distort or impede economic development in the sending countries. Speculative rises in the price of land and general inflation have been ascribed to the rapid influx of remittances. There is likely to be a good deal of social disruption associated with the large-scale absence of a quite age-sex specific segment of the population. At a very broad level, export of labour may seriously increase the vulnerability of a country to political and economic events in the receiving countries.

Empirical research on the consequences of labour migration for countries of origin is scarce and fragmentary. The modest number of case studies at the micro level which have been carried out suggest that the consequences vary considerably, often in response to unique local conditions, and that they are rarely either uniformly positive or detrimental.

Two difficulties have caused particular concern in the receiving countries. First, although the migrants usually are officially viewed as temporary, they are by no means always willing to depart when the host government wishes them to do so. Recent experience in various regions has been that the stocks of migrant workers and their families are strongly persistent. Secondly, where there are large stocks of migrant workers relative to the size of the national population, there are serious concerns that the migrant presence may contribute to political instability. Where the stocks of migrants have continued for some length of time, neither returning to their country of origin nor being assimilated into the host population, the so-called problems of the second generation have begun to appear: migrant children, marginal to both the cultures of their country of origin and of the host country, a disfranchised minority concentrated in separate and often sub-standard residential zones, with access only to the less desirable and less secure jobs. Further, the presence of the migrants is said to depress wages and working conditions for national workers, and thus to discourage the development of the national labour force. Finally, there appears to be a positive association between flows of migrant workers and of undocumented migrants.

There is no consensus on the net consequences of labour migration. However, it is probable that most governments in net receiving countries now view the long-term disadvantages as outweighing short-term gains, and hence that use of migrant labour should be avoided if possible. In the case of the resource rich countries of North Africa and the Middle East, the challenge of making use of large scale flows of migrant workers (and their dependents) while at the same time minimizing the difficulties that may attend such flows, is formidable. For the countries of origin the opportunities and risks may indeed be even greater.

Europe and the Mediterranean

Another cluster of countries which are linked by flows of labour migration are those of Western Europe and the Mediterranean. This system has functioned for nearly two decades and was an important factor in European economic growth during the 60s and the early 70s. However, the rate of increase in migrant stocks in this region sharply declined around 1974, the same time that the numbers of foreign workers began their rapid rise in the Middle East and in the Libyan Arab Jamahiriya. As Table 6.5 indicates, among the leading countries of immigration there was a substantial increase in the foreign population in the Netherlands, and moderate increases in several others. While the stocks continue to be substantial, their changes reflect less the effects of the entry of new migrant workers and more the results of family reunification and natural increase. To a considerable degree, this might be characterized as a period of relative stabilization in international migration for Europe, following the preceding decade and a half

Table 6.5. Total foreign population in selected European countries of immigration. (thousands)

Country of immigration	1974	1976	1978
Belgium	805	852	877
France	-	3,698	-
Federal Republic of Germany	4,127	3,948	3,981
Netherlands	315	376	435
Sweden	401	418	424
Switzerland	1,064	859	898

Source: OECD, Directorate for Social Affairs, Manpower and Education. Continuous reporting system on migration (SOPEMI), 1979.

when stocks and flows were building up steadily. During the second half of the 1970s, flows out of the leading countries of net immigration tended to decline from higher levels around 1975 and by the late 1970s were generally comparatively close to the flows in. Thus in most of these countries the average length of residence of immigrants tended to rise.

The patterns of flows of workers as well as of total migrants in the European-Mediterranean region share some characteristics with those observed in the Middle East. Here too there are distinct flows between specific pairs of countries, reflecting propinquity but also historic and cultural-linguistic ties. As may be observed in Tables 6.6 and 6.7, Algerians go to France but almost nowhere else, Austrians go to the German Federal Republic and Switzerland. Finns go almost exclusively to Sweden. On the other hand, migrants from some countries are rather concentrated in just one or two countries of destination. Italians and Moroccans tend to disperse rather more widely, but for rather different reasons. Emigration from Italy is of long standing and has been facilitated by the country's membership in the European Economic Unity.

As observed above, the proportions of all migrants who are workers in these European host countries do not differ very much from the corresponding figures for the leading countries of immigration in the Middle East. With the exception of Belgium, the proportions of total immigrants who are workers fall within the rather narrow range of .44 to .54. The proportion of Belgium is markedly lower at .36. (Moreover, the low proportions of workers in the total migrant flow for Belgium is generally consistent for migrants from all countries of origin and is particularly low, .23, for migrants from non EEC countries. An important factor associated with the low proportion of workers in the migrant stocks in Belgium is the high proportion of all migrants who are children; about one third of all migrants are in the ages 0 to 14).

There is also comparatively little variation in the proportions of workers among all migrants by country of origin. With the exception of Yugoslavia, the proportion for all countries, including other EEC countries, ranges between .44 and .55. Among the stock of migrants from Yugoslavia the proportion of all migrants classified as workers (.62) is distinctively high. On the other hand, migrants from the diverse sets of countries classified as "other non EEC" have a distinctly low proportion of workers, (.38). The proportion of other non-EEC migrants who are workers is particularly low in the case of Belgium, but is also below .4 for France, the German Federal Republic and the Netherlands.

Table 6.6. Stocks of foreign workers in selected countries of Western Europe, 1978. (thousands)

of ion	Country of origin													
	Algeria	Austria	Finland	Greece	Italy	Morocco	Portugal	Spain	Tunisia	Turkey	Yugo-slavia	Other, EEC	Other, non EEC	Total
	2.4	3.7	-	9.6	106.4	22.2	3.9	27.3	1.9	17.0	3.0	87.7	18.2	306.3
	361.0	-	-	-	175.8	181.4	385.0	184.5	73.7	36.3	43.1	66.2	135.8	1,642.8
al	-	76.0	2.9	153.3	305.1	-	59.9	95.8	-	540.5	380.2	131.6	216.6	1,961.9
	-	-	-	2.0	10.4	31.0	5.4	17.6	1.2	45.1	8.1	52.6	23.0	196.4
	0.3	2.0	104.5	8.1	2.7	0.6	0.9	1.7	0.4	4.5	24.6	32.0	42.2	224.5
	-	19.5	-	4.8	240.1	-	4.9	61.6	-	16.7	26.2	83.7	31.9	489.4

a) Based on data gathered in 1977.
b) Based on data gathered in 1976.

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gure is given, the nationality in question is not identified separately.

D, op cit.

Table 6.7. Stocks of foreign residents in selected countries of Western Europe, 1978. (thousands)

	Country of origin													
a	Algeria	Austria	Finland	Greece	Italy	Morocco	Portugal	Spain	Tunisia	Turkey	Yugo-slavia	Other, EEC	Other, non-EEC	Total
)	9.7	9.2	-	24.3	287.0	81.0	9.9	64.5	4.7	59.4	-	223.4	77.8	850.9
	790.2	-	-	-	465.9	299.9	823.0	507.3	147.1	57.9	74.0	153.0	379.9	3,698.2
eral	-	159.3	8.8	305.5	572.5	28.9	109.9	188.9	19.2	1,165.1	610.2	267.2	545.6	3,981.1
s	0.4	3.7	-	4.1	21.1	64.0	9.4	24.8	2.0	106.6	13.9	109.7	75.7	435.4
	0.6	3.7	187.6	18.1	5.5	1.4	1.7	3.6	0.9	14.7	40.4	61.1	84.9	424.2
d	-	34.7	-	8.9	442.7	-	7.5	96.1	-	29.6	37.7	168.8	72.1	898.1

Based on data gathered in 1977.

Based on data gathered in 1976.

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igure is given, the nationality in question is not identified separately.

ECD. op cit.

Membership in the European Economic Community is an important factor in European migration flows since such membership permits virtually unimpeded international movement within the community by citizens of Members States. In 1978, about one fourth of all migrants as well as of all migrant workers described in Tables 6.6 and 6.7 were of EEC-member origin (Italy + "other EEC"). Of these, just about two thirds are Italian. What is most notable is that there are considerable variations in the importance of migrants of EEC origin in the flows into the receiving countries, both members and non-members. Belgium and Switzerland each receive almost two thirds of their migrants from an EEC country while for France and Sweden, the corresponding proportions are about .15. However EEC membership does not make a perceptable difference in the proportion of workers in the total migrant flows.

In the leading countries of immigration of Europe, migrants tend to be between 5 and 10 percent of the total population. Exceptions are the Netherlands, where migrants were 3 percent of the total, and Switzerland, where they were 14 per cent as of 1978. The proportions of migrant workers in the total labour force were quite similar.

As of late 1978 and early 1979, unemployment rates had become comparatively high among foreign workers in Europe and were generally higher than those for national workers. The rate was highest in Belgium, 13.8 percent, was 8.6 percent in France, 5 percent in the German Federal Republic, 4.4 percent in Sweden and fell to 0.4 percent in Switzerland.

For most European countries, flow data for international migration are available along with information on existing stocks.6/ These data indicate that in 1978 Belgium had a net gain of 2,400 persons, down from an average of just about 9,200 in the two previous years. In France, permanent immigration was 58,500 in 1978, down from an average 79,000 in the three previous years. Empirical estimates of emigration from France are not available, but it is believed that they are likely to outweigh immigration. The German Federal Republic had a slight net gain of some 4,500 persons in 1978, following four successive years of net emigration. The Netherlands and Sweden each had comparatively small net inflows: 19,700 and 16,100 respectively. The net emigration from Switzerland was 10,500, a substantial reduction from the outflows of 29,000 in 1977 and 65,400 in 1976.

6/ OECD, *op. cit.*

The evidence of net migration rates converging on zero and of substantial rates of unemployment among foreign workers in a number of countries of immigration is a clear reflection of the relative economic slowdown in Europe.

Among the traditional leading countries of net emigration, Greece and Italy experienced moderate net inflows from 1975 onwards: many were returnees from Northern and Western Europe. For Italy, the net return was some 15,000 in 1977 and 3,600 in 1978. Spain and Portugal continued to experience emigration. Spain had a net outflow of 157,000 from 1975-1978. Portugal had an emigration of 17,000 in 1977 and 18,600 in 1978, chiefly to Canada, the United States of America and Venezuela. Regularizations of undocumented migrants to Venezuela and France suggest that at least an additional 11,700 departed in each of the two years. Turkey has continued to have net emigration, about 44,000 in 1978, with increasing numbers going to North Africa and the Middle East. For Yugoslavia, it appears that net migration has almost reached zero in recent years, with a small net return of workers offset by a small outward movement of dependents of workers previously established abroad.

As indicated in Table 6.8, remittances to countries with major emigration streams to Europe remained substantial. There were downward trends for Spain and Turkey and continuing rises for Greece, Portugal and especially for Yugoslavia. It should be noted that for a number of these countries not all remittances are sent by migrants in Europe. In the case of Greece, for example, 44 percent of all remittances came from North America. In the case of Tunisia, the figures reported include transfers from migrants in other Arab countries as well as from Europe. Therefore, estimates of per capita remittances based on net flows could be misleading. Such evidence as there is suggests that in general, though, the amounts were substantial. Estimates based on work done in Sweden indicate that in 1978 the average annual remittance of Greek workers was equivalent to nearly three months' wages in manufacturing industry.

The United Kingdom has had a rather distinctive pattern of international migration, not closely linked to those of the countries of Continental Europe. During recent years the predominant flows have produced a net emigration of an average of 40 thousand per year, made up chiefly from an immigration stream from the New Commonwealth, Pakistan and from other countries more than compensated for by an outflow largely to the Old Commonwealth and the Republic of South

Table 6.8. Net worker remittances for selected countries with significant migrant flows into Europe, recent years.

Country	Net worker remittances (million US dollars)					
	Year				As percentage of total exports	
	1970	1975	1977	1978	1970	1977
Algeria	209.0	397.0	309.4	-	19.3	5.0
Greece	324.0	707.8	880.3	984.0[a/]	29.9	19.5
Italy	-	979.0[a/]	1,412.0[a/]	-	-	-
Portugal	-	889.9	1,226.0[a/]	1,695.0[a/]	29.2	-
Spain	518.0	1,022.3	1,164.0	946.0[a/]	10.7	7.0
Tunisia	18.0	126.3	144.7	-	5.5	10.7
Turkey	264.0	1,293.1	943.4	-	34.2	40.3
Yugoslavia	498.0	1,695.0	2,097.0[a/]	2,899.0[a/]	20.7	27.8[b/]

Source: IBRD, *op cit*. and OECD, *op cit*.

a/ OECD estimates, not completely comparable to those of the World Bank. In the case of Yugoslavia the OECD estimates include both international transfers and money exchanged by Yugoslav workers while in Yugoslavia.

b/ 1975.

Africa. However, in the most recent period, mid 1978 to mid 1979, there was a small net immigration, 6,300. To a large extent this was a result of a decline in the number of emigrants to the countries of the Old Commonwealth and a small net inflow from South Africa.

A noteworthy reversal in the direction of international migration occurred in Ireland during the 1970s. According to a preliminary report of the 1979 Census of Ireland, the country experienced a net inward flow of some 107,000 persons over the period 1971-1979.7/ This represents a reversal of the historic pattern of net emigration from Ireland. The net immigration flow was at an annual rate of 4.2 per thousand for the 8-year period and had a sex ratio of 1.31.

Among the non-European developed countries, Canada had declining net immigration from 1974-75 when the figure reached 133,000, to 1978-79 when it fell to 30,000. The decline in net immigration mostly reflected the lower levels of immigration authorized by the Government in response to economic difficulties and comparatively high unemployment. By 1978, the majority of immigrants were admitted by reference to family reunification. Before the 1970s, the great majority of Canada's immigrants came from Europe. However, there has been a steady trend toward the acceptance of increasing proportions of migrants from other regions, especially from Asia. During the later 1970s, 63 percent of all immigrants reported their last previous residence to have been other than in Europe.

In Australia, the overall tendency was for a rise in net permanent and long-term migrants during the later 70s. In 1979, net long-term and permanent immigration was 69,000, as compared to 51,600 in 1978. An important factor in the increase was the larger numbers of immigrants from Vietnam and from New Zealand. The long-term trend toward diminishing proportions of immigrants from Europe continued during this period: by 1979, one fourth of all the migrants had been born in Europe.

The United States of America has continued to receive immigrants with a moderately rising trend.. From 1974 through 1976 the number admitted as immigrants was about 400,000 per year. In 1978, the number admitted for permanent residence plus refugees rose to 530,000 and in 1979 to 559,000. As with Australia and Canada, the trend toward drawing a progressively smaller proportion of all migrants from Europe continued. By 1977, 16 percent of the migrants admitted reported their previous permanent residence as Europe.

7/ Ireland, Census of Population of Ireland, 1975 (Dublin, 1979). p. IX.

Refugees

During this most recent period, there have been a series of large-scale refugee flows. As of mid 1980, the global total number of refugees reported by various United Nations agencies had risen to 8.0 million. Of this total, 80 percent have found refuge in developing countries.

It has been estimated that in all of Asia, there were some 3.5 million refugees. In South West Asia, there were just over 2 million refugees -chiefly Palestinians- of concern to United Nations agencies. It is estimated that in South East Asia more than one million refugees had fled their country in very recent years, although some have by now returned. Thailand has received over 325,000 refugees from Kampuchea, Laos and Vietnam, some 81,000 of whom have subsequently been resettled elsewhere. China has received 235,000 refugees and displaced persons from Vietnam. At the same time Vietnam experienced an inflow of 150,000 persons from Kampuchea, many of whom have more recently been repatriated. The United States has accepted about 130,000 refugees from this region. A substantial proportion of the 146,000 refugees established in France are from this region. Others have been received within the ASEAN region, notably in Australia which has a stock of just over 300,000 refugees in all, Hong Kong with 56,000, and Malaysia which has received 98,000. Elsewhere in Asia, some 710,000 refugees from Afghanistan entered Pakistan during late 1979 and early 1980. By late 1980, the Office of the High Commissioner for Refugees reported that the number had risen to 1.2 million.

The largest number of refugees for any sub region is the currently estimated 2.8 million found in Sub-Saharan Africa. It is reported that there are over one million refugees from Ethiopia in Somalia and the Sudan has some 500,000 refugees from Ethiopia and other neighbouring countries. There are estimated to be just less than 300,000 refugees in Zaire. In North America, the United States of America has recently received a renewed flow from Cuba, estimated to be over 100,000 in early 1980, along with a continuing influx from Haiti. The total number of refugees anticipated by the United States for 1980 is some 365,000. Canada has recently reported its readiness to accept 27,000 refugees for 1980, the expectation being that they will come chiefly from South East Asia.

To conclude, the review of these three issues brings out several general characteristics of international migration. First, international migration flows in the modern world continue to show elements of continuity with past conditions. An instance of this is the importance of historic links between selected pairs of countries in influencing contemporary streams of migrant workers. A second characteristic of international migration, though, is the rapidity with which flows can change. A trickle may become a flood within a period of only a few years. Third, international migration is strongly and directly linked to the development process overall and to the international division of labour in particular. Finally, international migration is a factor of significant and probably increasing importance for development. For example, it can clearly have a major impact on composition of the labour force and international flows of funds, in addition to sheer demographic consequences which may themselves be very considerable.

Chapter 7

URBANIZATION

The distribution of people among geographical regions, between rural and urban residences, and within the system of cities is one of the essential characteristics of any population. Its pattern is intimately tied to the social and economic development of a country in different ways: the geographical distribution of a population, in part, is the result of the development that has taken place in the country, but on the other hand, it also defines one of parameters of socio-economic development. For example, the distribution of people is influenced by the way in which a country became a nation-state, and the distribution in itself affects the division of labour (i.e., the production and exchange of goods and services).

There are also connexions between the various components of population distribution. The concentration of the population within a certain geographical region is often related to the existence of a "primate" city, i.e., one that is substantially larger than the next two or three largest cities. On the other hand, the incidence of primacy is less frequent among countries with a high proportion of the population living in cities. Population distribution, because of its many social and economic consequences, has been identified by many governments as one of their most serious concerns, and attention is increasingly focussed upon urban aspects, particularly the growth of large cities. 1/ This chapter therefore presents new information about changes in (1) the urban-rural differential; (2) the system of cities, or urban hierarchy; and (3) the growth of large cities. The discussion of the new data to be presented will show that the world's urban population, as is already the case for the world's rural and total population, will soon (by the end of the twentieth century) become concentrated in less developed countries, and that a substantial part of future urbanization will occur in large cities.

1/ See, for example, United Nations, Population Distribution Policies in Development Planning, Papers of the Workshop on Population Distribution Policies in Development Planning, Bangkok, September 1979, ST/ESA/SER.A/75, In Press. Also, Report on Monitoring of Population Policies, E/CN.9/XX/CRP.2.

A. Size and growth of urban and rural populations

The prevailing pattern in developed and, particularly in developing countries is one of net rural-to-rural migration. Consequently, rural populations grow at a slower rate than their rate of natural increase (since part of the natural increase is "drained off" by rural-to-urban migration), while the growth of urban populations is a function of both natural increase and rural-to-urban migration. Recent findings from a study by the Population Division 2/ showed that while for the more developed countries rural-to-urban migration is the more prominent source for urban population growth, the opposite is true in developing countries: in the latter, natural increase which of course tends to be high for both urban and for rural components of the total population, accounts for almost three-fifths (58.3 per cent) of total urban population growth.

Despite the important role of rual net out-migration, the reasons for this process are still not entirely clear. Factors associated with rural net out-migration during recent decades were found to include level and increases in per capita GDP (which tends to be linked to the proportion of the labour force engaged in agriculture); initial proportion urban, rural rate of natural increase, and the growth rate of agricultural production per rural resident. 3/

A very substantial body of scholarly effort has been given to the disentangling of the relative importance of the various factors associated with net rural-to-urban migration. Particular attention has been given to the respective roles of economic, demographic, social and political conditions and to the importance of those experienced chiefly in rural areas of origin as distinguished from others experienced chiefly in urban areas of destination. As a whole, the issue remains unresolved but it now appears quite clear that there are multiple causes in complex interaction at work, functioning both in areas of origin and destination. Reeently, there appears to be a tendency to give greater attention to factors operating in rural areas than was the case earlier. 4/ It is in

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2/ United Nations, Patterns of Urban and Rural Population Growth, (ESA/SER.A/68), 1980.

3/ United Nations, World Population Trends and Policies - 1979 Monitoring Report, Vol. I (forthcoming).

4/ See, for example, Michael P. Todaro, Internal Migration in Developing Countries, International Labour Organization, Geneva, 1976. Firebaugh, Glenn, "Structural determinants of urbanization in Asia and Latin America, 1950-1970", American Sociological Review, No. 44 (April 1979), pp. 199-215.

the context of the relationships between these various factors that we turn to the discussion of urban and rural population growth and growing urbanization.

It has been observed in previous reports that urbanization is occuring rapidly and, further, that urbanization is mainly a consequence of the rapid increase in total populations. This report is intended to update the previous quantitative estimates and projections of urbanization and, further, to highlight the unique aspects of recent and projected urbanization: namely, that world urbanization is increasingly taking place in developing countries and also is increasingly large scale, as manifested by the pre-eminence of large cities and agglomerations in the urban structure.

The most recently updated estimates and projections of urban and rural population, based on the 1978 estimates and projections of total population, are shown in Tables 7.1 and 7.2. They highlight the major geographic regions individually as well as the world total and totals of the more and less developed regions collectively. Table 7.3 shows the per cent urban within each area.

In 1975 the developing regions achieved for the first time in modern history a majority of the world's urban population. Only five years later in 1980, the urban population of the developing countries exceeds that of the developed countries by about one fourth. By the year 2000 it is expected that the urban population of the developing regions will be more than double the urban population of the more developed regions.

Figure 1 demonstrates that the share of each of the individual developing areas (South Asia, Latin America and Africa) is increasing, except in East Asia where the share has recently begun to level off. All of the developed areas (Europe, Northern America, the USSR and Oceania) are experiencing a decline in their share of the world's urban population. The decline in Europe, the birthplace of urban industrialization, is particularly precipitous. Europe, which still contained almost a third of the world's urban population as recently as 1950, is projected to contain less than 15 per cent 20 years from now.

The absolute increases in population associated with the increased urban shares of the less developed countries are enormous. Indeed, the

Table 7.1. Urban population and urban average annual growth rates. Major areas and regions, 1970-2000

Region	Urban population (millions) 1970	1975	1980	1985	1990	2000	Urban annual growth rate 1970-1975	1975-1980	1980-1985	1985-2000
WORLD TOTAL	1368	1574	1809	2085	2403	3162	2.8	2.8	2.8	2.8
MORE DEVELOPED REGIONS a/	687	747	802	857	911	1010	1.7	1.4	1.3	1.1
LESS DEVELOPED REGIONS b/	681	827	1008	1228	1493	2152	3.9	4.0	4.0	3.7
Africa	81	104	135	175	224	350	5.1	5.2	5.8	4.6
Eastern Africa	11	15	22	30	41	71	7.0	7.0	6.8	5.7
Middle Africa	10	14	18	24	30	44	5.7	5.5	5.2	4.2
Northern Africa	30	38	48	60	75	108	4.5	4.7	4.5	3.9
Southern Africa	11	13	15	18	22	31	3.1	3.5	3.7	3.5
Western Africa	18	24	32	42	56	95	5.6	5.7	5.7	5.4
Latin America	162	197	238	285	338	456	3.9	3.8	3.6	3.1
Caribbean	11	13	16	18	21	27	3.5	3.1	3.0	2.6
Middle America	36	45	56	70	86	124	4.4	4.4	4.3	3.8
Temperate South America	28	31	34	37	40	45	1.9	1.8	1.7	1.4
Tropical South America	87	108	133	161	191	260	4.4	4.1	3.8	3.2
Northern America	159	170	181	195	209	234	1.3	1.3	1.4	1.2
East Asia	277	323	371	425	487	634	3.1	2.8	2.7	2.7
China	178	209	243	284	334	459	3.1	3.1	3.1	3.2
Japan	74	84	91	97	102	111	2.4	1.7	1.2	0.9
Other East Asia	24	30	37	44	51	64	4.6	4.0	3.5	2.5
South Asia	235	286	353	437	542	818	4.0	4.2	4.3	4.2
Eastern South Asia	57	69	85	106	131	197	3.9	4.1	4.3	4.2
Middle South Asia	146	175	215	266	332	510	3.7	4.1	4.3	4.3
Western South Asia	32	42	53	66	80	111	5.1	4.7	4.3	3.5
Europe	302	323	341	358	374	408	1.4	1.0	1.0	0.9
Eastern Europe	55	60	65	71	76	86	1.6	1.8	1.6	1.3
Northern Europe	65	68	70	71	73	76	0.8	0.5	0.4	0.4
Southern Europe	72	80	87	94	101	114	2.1	1.7	1.6	1.3
Western Europe	110	116	119	122	125	133	1.1	0.5	0.5	0.6
Oceania	14	16	17	19	21	25	2.5	2.1	2.0	1.7
USSR	138	155	173	191	208	237	2.3	2.2	2.0	1.5

a/ Including Northern America, Japan, all regions of Europe, Australia, New Zealand and USSR.

b/ Including all regions of Africa, all regions of Latin America, China, other East Asia, all regions of South Asia, Melanesia, Micronesia and Polynesia.

Table 7.2. Rural population and rural average annual growth rates, major areas and regions, 1970-2000

Region	Rural population (millions)						Rural annual growth rate			
	1970	1975	1980	1985	1990	2000	1970-1975	1975-1980	1980-1985	1985-2000
WORLD TOTAL	2309	2459	2606	2745	2873	3038	1.3	1.2	1.1	0.7
MORE DEVELOPED REGIONS [a]	362	346	329	312	295	263	- 0.9	- 1.0	- 1.1	- 1.1
LESS DEVELOPED REGIONS [b]	1947	2113	2277	2433	2577	2775	1.6	1.5	1.3	0.9
Africa	273	302	334	370	406	478	2.0	2.0	2.0	1.7
Eastern Africa	90	100	112	125	140	171	2.2	2.2	2.3	2.1
Middle Africa	31	33	35	37	39	42	1.1	1.1	1.1	0.9
Northern Africa	52	56	61	65	69	75	1.5	1.6	1.4	1.0
Southern Africa	14	16	18	19	21	23	2.3	2.1	1.9	1.1
Western Africa	86	97	109	123	137	167	2.4	2.4	2.4	2.0
Latin America	121	125	130	135	141	152	0.8	0.8	0.8	0.8
Caribbean	14	15	15	15	16	16	0.8	0.5	0.5	0.4
Middle America	31	34	36	39	42	48	1.6	1.6	1.5	1.3
Temperate South America	8	8	7	7	7	6	- 0.9	- 0.8	- 0.8	- 0.8
Tropical South America	68	70	71	74	76	81	0.5	0.6	0.6	0.7
Northern America	67	66	65	64	62	56	- 0.2	- 0.4	- 0.4	- 0.9
East Asia	704	741	765	779	787	772	1.0	0.6	0.4	- 0.1
China	647	687	714	731	742	730	1.2	0.8	0.5	- 0.0
Japan	30	28	25	23	21	18	- 1.5	- 1.9	- 2.0	- 1.5
Other East Asia	27	26	26	25	24	23	- 0.3	- 0.5	- 0.6	- 0.4
South Asia	875	969	1069	1169	1261	1388	2.0	2.0	1.8	1.1
Eastern South Asia	229	255	282	309	333	362	2.2	2.0	1.5	1.1
Middle South Asia	605	670	741	812	878	972	2.1	2.0	1.8	1.2
Western South Asia	42	44	45	47	49	53	0.8	0.8	0.8	0.8
Europe	157	151	143	135	127	112	- 0.8	- 1.1	- 1.1	- 1.2
Eastern Europe	48	47	45	43	41	36	- 0.8	- 0.7	- 0.9	- 1.2
Northern Europe	15	14	12	11	10	9	- 1.9	- 2.1	- 2.0	- 1.6
Southern Europe	56	54	52	50	47	43	- 0.5	- 0.8	- 0.9	- 1.1
Western Europe	38	36	33	31	29	25	- 1.0	- 1.6	- 1.5	- 1.4
Oceania	6	6	6	5	5	5	- 0.0	- 0.4	- 0.6	- 0.3
USSR	106	99	94	89	84	75	- 1.2	- 1.1	- 1.1	- 1.2

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a/ Including Northern America, Japan, all regions of Europe, Australia, New Zealand and USSR.

b/ Including all regions of Africa, all regions of Latin America, China, Other East Asia, all regions of South Asia, Melanesia, Micronesia and Polynesia.

Table 7.3 Proportions of population living in urban areas, by major areas and regions, 1970-2000

(percentage)

Region	1970	1975	1980	1985	1990	2000
WORLD TOTAL	37.2	39.0	41.0	43.2	45.6	51.0
MORE DEVELOPED REGIONS a/	65.5	68.3	70.9	73.3	75.5	79.4
LESS DEVELOPED REGIONS b/	25.9	28.1	30.7	33.5	36.7	43.7
Africa	22.8	25.6	28.8	32.1	35.5	42.2
Eastern Africa	10.6	13.1	16.1	19.4	27.8	29.4
Middle Africa	25.1	29.7	34.5	39.2	43.8	51.5
Northern Africa	36.9	40.4	44.2	48.0	51.9	59.0
Southern Africa	43.8	44.8	46.5	48.7	51.4	57.7
Western Africa	17.4	19.8	22.5	25.6	28.9	36.2
Latin America	57.3	61.2	64.7	67.8	70.6	75.1
Caribbean	44.6	48.0	51.2	54.3	57.2	62.3
Middle America	53.8	57.3	60.7	63.9	66.9	72.2
Temperate South America	77.9	80.1	82.2	83.9	85.4	87.8
Tropical South America	56.2	60.8	65.0	68.6	71.6	76.2
Northern America	70.4	72.0	73.7	75.4	77.2	80.7
East Asia	28.2	30.3	32.7	35.3	38.2	45.1
China	21.6	23.2	25.4	28.0	31.1	38.6
Japan	71.3	75.1	78.2	80.8	82.9	85.9
Other East Asia	47.4	53.5	59.0	63.8	67.7	73.2
South Asia	21.2	22.8	24.8	27.2	30.1	37.1
Eastern South Asia	20.0	21.4	23.2	25.4	28.2	35.3
Middle South Asia	19.4	20.7	22.5	24.7	27.4	34.4
Western South Asia	43.5	48.8	53.7	58.0	61.7	67.5
Europe	65.8	68.2	70.5	72.6	74.7	78.4
Eastern Europe	53.2	56.2	59.2	62.2	65.1	70.4
Northern Europe	81.3	83.3	85.0	86.4	87.7	89.6
Southern Europe	56.2	59.4	62.5	65.3	68.0	72.8
Western Europe	74.4	76.3	78.1	79.8	81.3	84.2
Oceania	70.8	73.4	75.7	78.0	80.0	82.6
USSR	56.7	60.9	64.8	68.2	71.3	76.0

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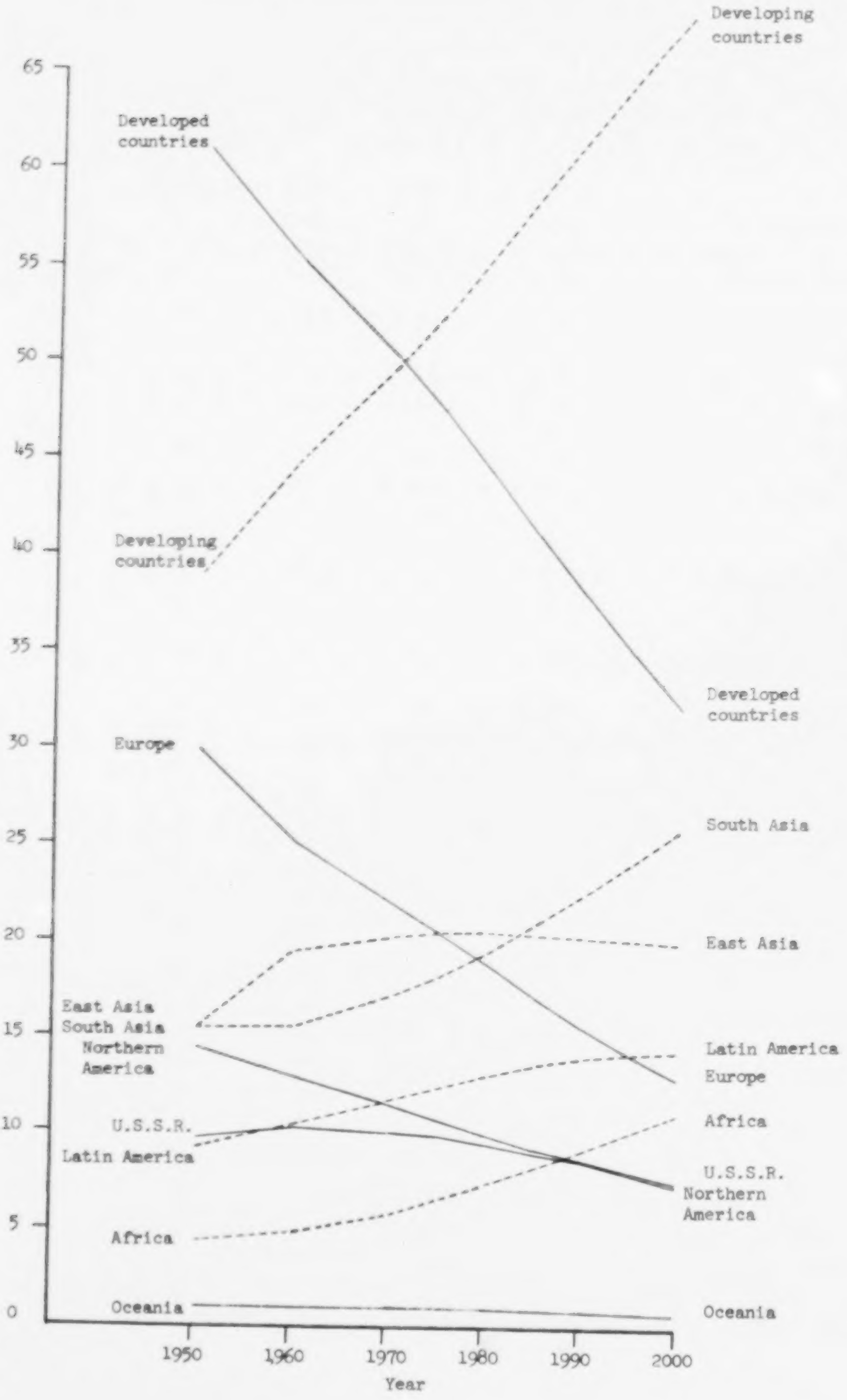
a/ Including Northern America, Japan, all regions of Europe, Australia, New Zealand and USSR.

b/ Including all regions of Africa, all regions of Latin America, China, Other East Asia, all regions of South Asia, Melanesia, Micronesia and Polynesia.

Figure 1. Percentage of the world's urban population by geographic region and for developed and developing regions, 1950-2000



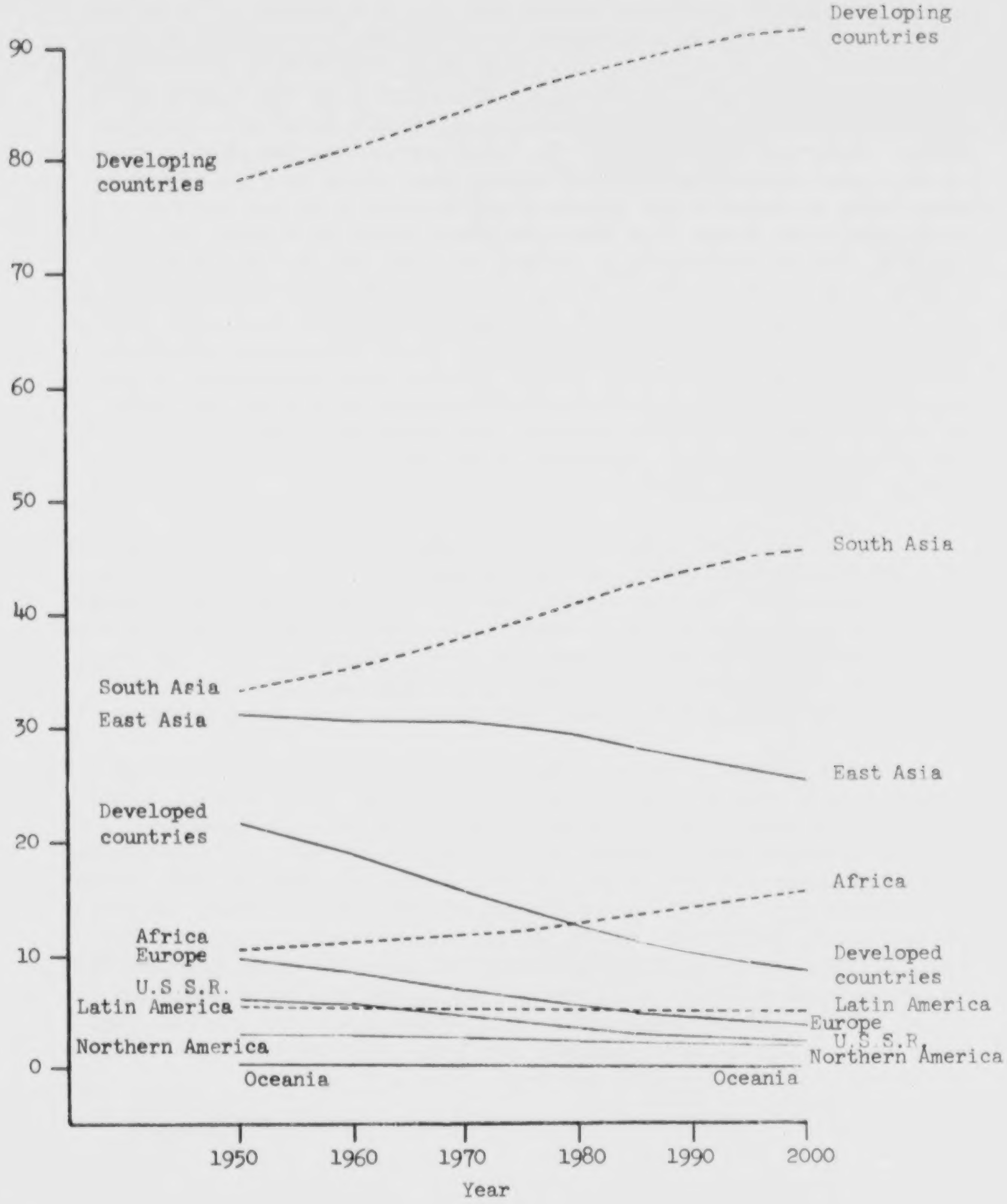
urban population of the less developed regions is expected to double in the last 20 years of this century, whereas the urban population of the developed countries should increase by only about a fourth. Africa has the fastest growing urban population, followed by South Asia. Both of these populations are expected to double by the year 2000. Latin America's urban population is projected to be almost double. Meanwhile Europe may experience only a 20 per cent increase in its urban population.

The situation with regard to the distribution of the world's rural population is similar to that of the urban population but more striking (Table 7.2.). As in the case of the urban population, the shares of the world's rural population contained within each of the more developed areas shown in Figure 2 are declining and the shares of the world's rural population in the less developed areas except East Asia are increasing, but the differentials between the more and the less developed areas are much more extreme and increasing. Whereas the urban population of the developing regions presently exceeds that of the developed regions by almost one fourth, the rural population of the developing regions is almost seven times as large as that of the developed regions and by the year 2000 the rural population of the developing regions will be about 10 times as large as that of the developed countries. Almost half of the increase of the rural population of the developing countries is located in South Asia alone.

Whereas the rural population of the developing regions will increase by a little more than twenty per cent between now and the year 2000, the rural population of the developed regions will actually decrease by about 20 per cent. In absolute terms, most of the widening gap is due to trends in the developing regions. Whereas the developed regions will lose about 66 million rural inhabitants between now and the year 2000, the less developed regions will gain almost half a billion rural inhabitants.

During the last five years the world's urban population has been expanding at a rate of about 2.8 per cent per year. This average is the net result of relatively slow urban growth in the developed regions (1.4 per cent per year) combined with rapid urban growth in the developing regions (4.0 per cent per year). In both cases, the rates of urban growth are expected to slow somewhat by the end of the century. Among the developed areas, Europe has the slowest urban growth rate, 1 per cent per year, followed by Northern America which had an annual urban growth rate of 1.3 per cent per year. By contrast, among the developing countries, Africa had the highest urban growth rate, about 5 per cent per year, and South Asia, which is heavily weighted by India, had the next highest urban growth rate, about 4 per cent per year.

Figure 2. Percentage of the world's rural population by geographic region and for developed and developing regions, 1950-2000



Population in the rural areas of the world has grown at a rate of 1.2 per cent annually during the last five years. This has been the net result of negative rural growth in the developed areas (-1.0 per cent per year) and a positive rural growth rate of 1.5 per cent per annum in the developing countries. The rural growth rate of population in the developing countries roughly equals the growth rate of urban areas. Rural decline in the developed countries is expected to continue at roughly one per cent per year until the end of the century, while rural population growth in the developing countries is expected to slow to about one per cent per year. Among the developed areas, Europe and the USSR had the greatest rates of rural decline. As was the case with urban growth, Africa and South Asia had the greatest rates of increase in their rural populations.

As a consequence of the above differentials in urban and rural growth, only 20 years from now, in the year 2000, we will probably pass a significant milestone in human demographic history. The world's population which had always been largely rural, will become predominantly urban. By that year some 51 per cent of the world's inhabitants will be urban dwellers. Urban majorities are quite recent in both developed and developing regions; even the developed regions barely achieved an urban majority at mid-century. Moreover, developing regions alone will almost achieve an urban majority by the end of this century, as they are expected to become 44 per cent urban, compared to 31 per cent at present. The proportion of the population in the developed regions, which is urban, will increase by almost 9 percentage points to reach a level of almost 80 per cent urban in the year 2000, though there is evidence in some countries, discussed below, that the relative growth of non-metropolitan or at least smaller metropolitan areas is gaining.

As far as individual regions are concerned, each one in both the developed and the developing regions tends to conform closely to the average of its development category, with the exception of Latin America. Whereas the per cent urban in the developing regions as a whole is 31, the percentage urban in Latin America is more than double that figure. In this regard, Latin America is more typical of a developed than a developing region.

B. Size of locality

Turning now to the scale of urbanization, it is obvious from Figure 3 and Tables 7.4 and 7.5 that the percentage of the world's urban population residing in cities of 4 million or more is increasing rapidly. In 1950 only 10 per cent of the world's urban population resided in the largest cities. At the present time the proportion is about 17 per cent and by the year 2000 it will rise to almost a quarter of the world's urban population. The number of cities with 4 million or more inhabitants now stands at almost 40, and it is projected that by the year 2000 the number of such cities will more than double. It is difficult to project with as much confidence the population of cities in the smaller size categories. Data on small cities and towns which may grow or agglomerate into those categories are limited. However, the available evidence suggests that the total population of cities in the smaller size categories are unlikely to grow very much and may even decline somewhat by the year 2000. The share of the world's urban population accounted for by cities between 500,000 and 4,000,000 has remained relatively constant and is expected to remain roughly the same for the rest of the century.

As illustrated in Figure 4, the greatest contrast between the developed and the developing regions with regard to the patterns of development of the various size of place categories over time relates to the share of the urban population living in cities of 4 million inhabitants or more. Whereas the urban population share of the cities of 4 million or more in the less developed regions is increasing very rapidly, the share of such cities in the urban population of the developed regions is levelling out at about 18 per cent and may even decline somewhat by the end of the century. It is clear that much of the rapid increase in these largest cities has been in the developing rather than the developed regions. During the past decade, the world acquired 14 additional cities in the largest category. Eleven of these were in the developing regions where the number of cities in the largest category increased from 12 in 1970 to 23 in 1980. It is noteworthy that a large majority of the largest cities in the less developed regions are in Asia. By the year 2000, about a quarter of the urban population of the less developed regions is projected to be living within about 60 cities of 4 million or more inhabitants,

The rapid growth of the share of the world's urban population living in cities of 4 million or more inhabitants has naturally been associated with a more rapid growth in absolute numbers in these cities. In addition,

Figure 3. Shares of world urban population by size of place category

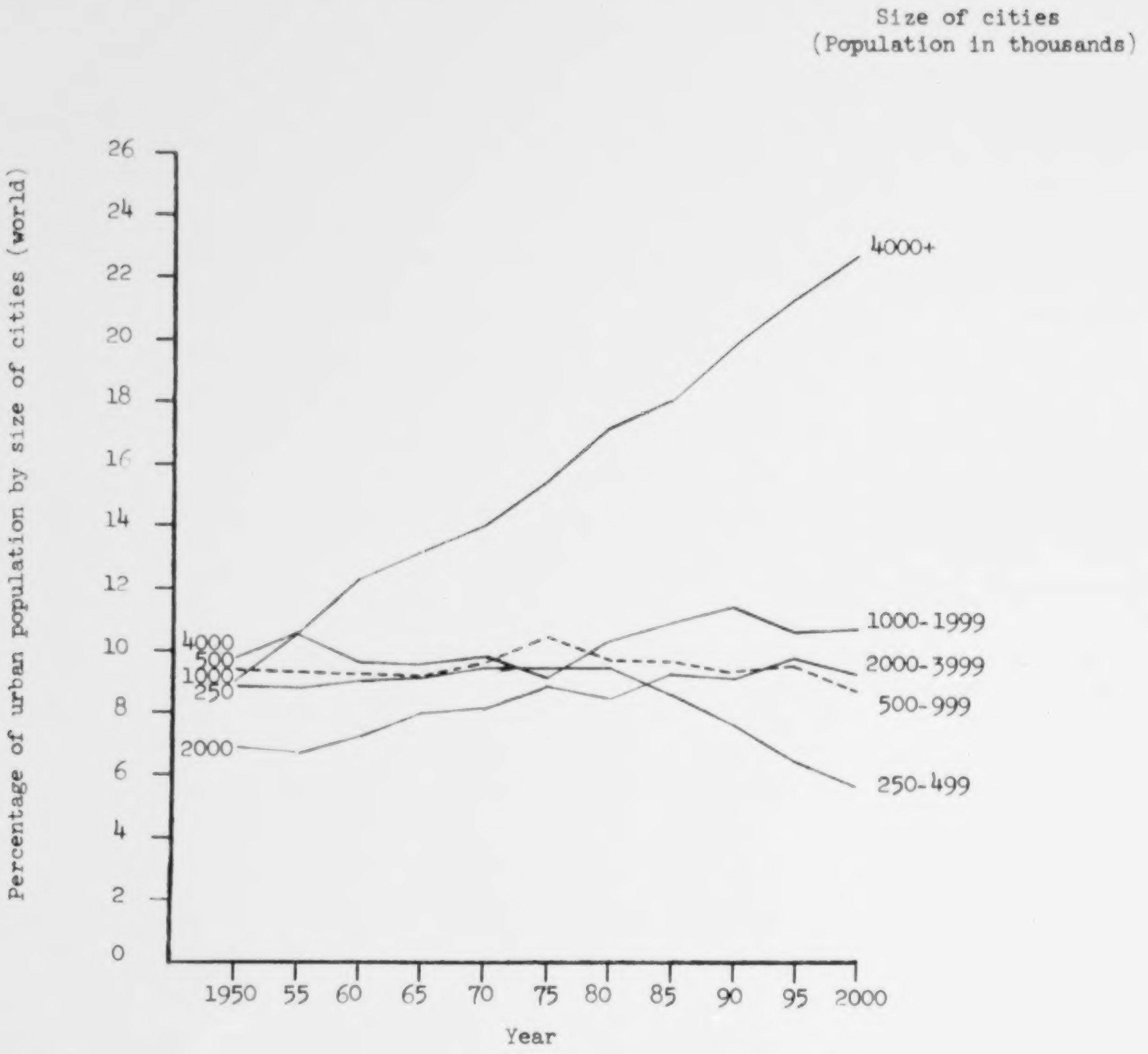


Table 7.4: Number of cities, population, and per cent of total urban population in cities of a certain minimum size, 1970-2000

Size of city	1970	1975	1980	1985	1990	2000
World total						
4,000,000+						
Population (in thousands)	191,394	243,431	311,425	377,758	479,173	718,800
Number of cities	24	30	38	44	56	82
Per cent of urban	14.0	15.5	17.2	18.1	19.9	22.7
2,000,000+						
Population (in thousands)	303,227	383,890	465,378	572,040	699,093	1,012,392
Number of cities	64	81	95	115	136	192
Per cent of urban	22.0	24.4	25.7	27.4	29.1	32.0
1,000,000+						
Population (in thousands)	438,256	529,494	653,640	800,550	974,820	1,354,444
Number of cities	160	185	234	284	338	440
Per cent of urban	32.0	33.6	36.1	38.4	40.6	42.8
500,000+						
Population (in thousands)	570,279	694,767	830,815	1,003,931	1,200,398	1,632,951
Number of cities	349	419	487	578	666	839
Per cent of urban	41.7	44.1	45.9	48.2	50.0	51.7
250,000+						
Population (in thousands)	700,678	844,345	1,003,560	1,184,753	1,386,653	1,812,839
Number of cities	729	853	982	1,092	1,189	1,342
Per cent of urban	51.2	53.7	55.5	56.8	57.7	57.3
More developed regions						
4,000,000+						
Population (in thousands)	108,281	125,222	135,511	149,734	163,873	179,122
Number of cities	12	14	15	17	19	21
Per cent of urban	15.8	16.8	16.9	17.5	18.0	17.7
2,000,000+						
Population (in thousands)	165,743	187,860	203,812	230,985	248,780	273,501
Number of cities	33	37	40	48	51	56
Per cent of urban	24.1	25.2	25.4	27.0	27.3	27.1
1,000,000+						
Population (in thousands)	235,270	264,525	298,882	330,240	362,990	398,216
Number of cities	83	92	110	123	137	146
Per cent of urban	34.2	35.4	37.3	38.5	40.0	39.4
500,000+						
Population (in thousands)	306,760	342,2[illegible]	377,560	415,314	454,433	511,237
Number of cities	184	199	223	247	274	313
Per cent of urban	44.[illegible]	45.8	47.1	48.5	50.0	50.6

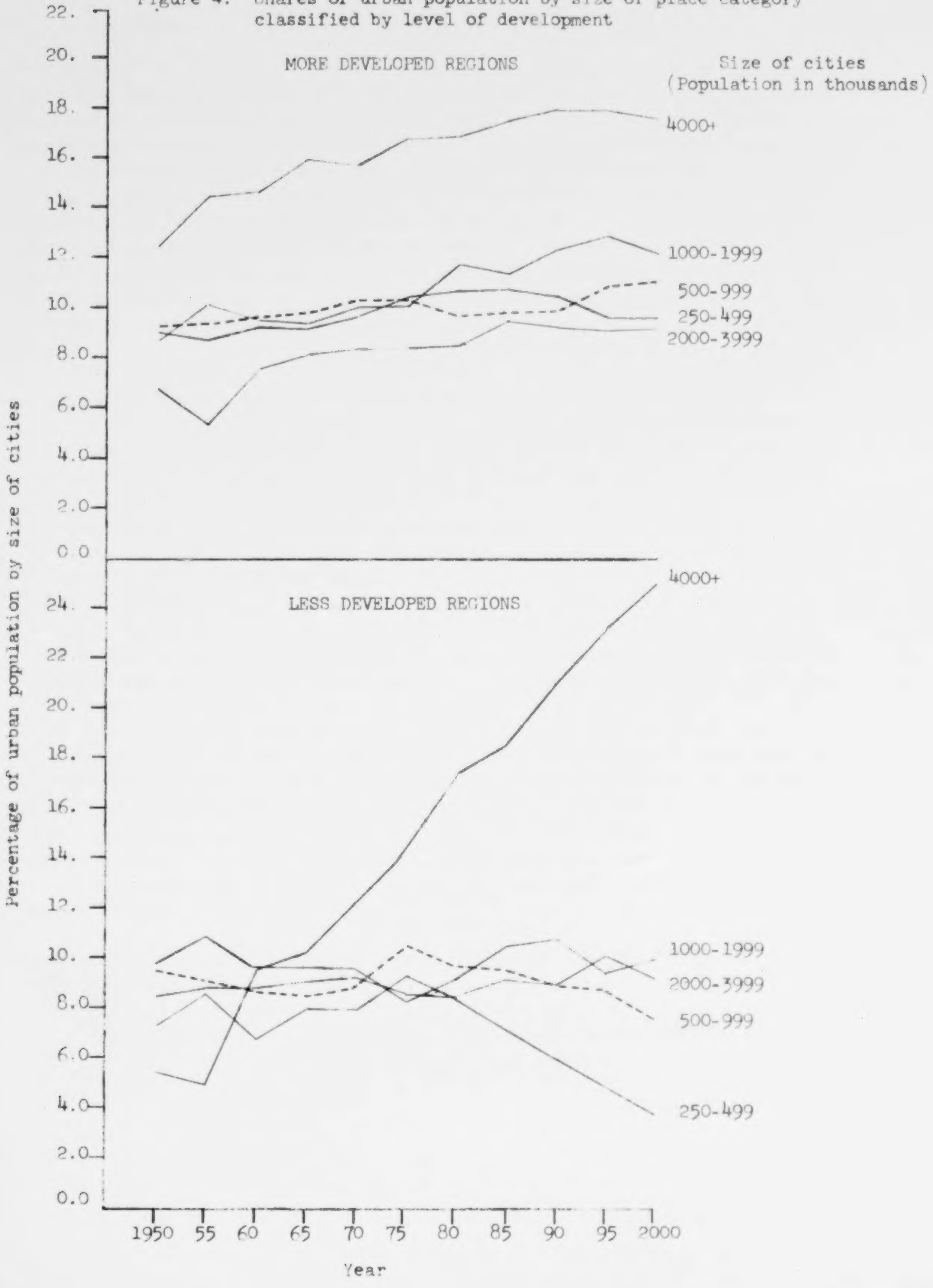
Table 7.4. (continued)

Size of city	1970	1975	1980	1985	1990	2000
More developed regions (continued)						
250,000+						
Population (in thousands)	373,368	420,437	463,523	508,433	549,943	609,166
Number of cities	381	425	471	515	548	592
Per cent of urban	54.3	56.3	57.8	59.3	60.4	60.3
Less developed regions						
4,000,000+						
Population (in thousands)	83,113	118,208	175,914	228,022	315,300	539,677
Number of cities	12	16	23	27	37	61
Per cent of urban	12.2	14.3	17.5	18.6	21.1	25.1
2,000,000+						
Population (in thousands)	137,484	196,030	261,566	450,312	738,891	341,055
Number of cities	31	44	55	85	136	67
Per cent of urban	20.2	23.7	26.0	27.8	30.2	34.3
1,000,000+						
Population (in thousands)	202,985	264,968	354,758	470,309	611,830	956,230
Number of cities	77	93	124	161	201	294
Per cent of urban	29.8	32.0	35.2	38.3	41.0	44.4
500,000+						
Population (in thousands)	263,509	352,537	453,255	588,616	745,965	1,121,714
Number of cities	165	220	264	331	392	526
Per cent of urban	38.7	42.6	45.0	47.9	50.0	52.1
250,000+						
Population (in thousands)	327,310	423,907	540,036	676,320	836,709	1,203,673
Number of cities	348	428	511	577	641	750
Per cent of urban	48.1	51.3	53.6	55.1	56.1	55.9

Table 7.5: Average annual growth rates of city population by minimum city size, 1970-2000

Size of city	Average annual growth rates (percentage)				
	1970-1975	1975-1980	1980-1985	1985-1990	1990-2000
World total					
4,000,000+	4.81	4.93	3.86	4.76	4.06
2,000,000+	4.72	3.85	4.13	4.01	3.70
1,000,000+	3.78	4.21	4.05	3.94	3.29
500,000+	3.95	3.58	3.79	3.57	3.08
250,000+	3.73	3.45	3.32	3.15	2.68
More developed regions					
4,000,000+	2.91	1.58	2.00	1.80	0.89
2,000,000+	2.51	1.63	1.48	0.95	2.50
1,000,000+	2.34	2.44	1.89	2.00	0.93
500,000+	2.19	1.96	1.91	1.80	1.18
250,000+	2.37	1.95	1.57	1.85	1.02
Less developed regions					
4,000,000+	7.04	7.95	5.19	6.48	5.37
2,000,000+	7.10	5.77	5.31	5.56	4.95
1,000,000+	5.33	5.84	5.64	5.26	4.47
500,000+	5.82	5.03	5.23	4.74	4.08
250,000+	5.17	4.84	4.50	4.26	3.64

Figure 4. Shares of urban population by size of place category classified by level of development



the number of cities in this open-ended category has grown by "graduation" of smaller cities into the upper open-ended category. For both reasons, the category cities of 4 million or more inhabitants, has been increasing in population somewhat more rapidly than other size categories of cities. During the last decade, cities of 4 million or more inhabitants as a group increased by about two-thirds -- from 191 million inhabitants to 311 million -- while the total urban population of the world increased by only one-third -- from 1.37 billion to 1.81 billion. Between now and the year 2000, it is projected that the population of cities in the 4 million and over category will more than double -- from 311 million to 719 million -- while total urban population will increase by 75 per cent -- from 1.81 billion to 3.16 billion.

The preceding discussion emphasized the fact that the greater part of urbanization through the end of the present century will occur in developing countries. This process has many consequences and poses many issues; a few of the most salient ones are noted here.

Past experience has shown that urbanization tends to be closely associated with the process of demographic transition, i.e., the move towards modest mortality and fertility levels. Urbanization has also provided the infrastructure in terms of transportation, communication, and commerce that is essential for industrialization. The shape of these relationships might differ in developing countries as compared with developed countries but their direction is likely to be the same.

Yet there are also important costs associated with urbanization, particularly in the case of very large cities and in countries where urbanization is taking place at a very rapid pace. As regards the rate of urbanization, there is a clear analogy to the rate of total population growth: in most instances it is not the absolute size of population (or of proportion urban) which is of the greatest importance. Rather, it is the rate of growth. High rates in and of themselves, are likely to impose sharp strain.

Similarly, extreme levels of concentration of urban population into one or a few cities may produce economic as well as social and political stresses. It is generally accepted that beyond a certain size (but one which is unknown in any given case) per capita costs for essential services and infrastructure rise significantly.

Moreover, a high level of urban concentration may be detrimental to national development by impeding the growth of other regions. 5/. The concentration of the urban population in a single primate city or in a few large cities (such as the triangle of São Paulo-Rio de Janeiro-Belo Horizonte in Brazil) can lead to serious regional imbalances. This suggests that the shape of the urban hierarchy, as well as the proportion urban *per se*, needs to be examined further in terms of such factors as the division of labour, capital transfers, transportation networks, or migration streams.

C. The mega-city

Major cities have existed for a long time but the scale of these cities has not been as large as those we now encounter. Some of the very famous ancient cities contained no more than a few thousand inhabitants. During the nineteenth century cities of 100,000 or more inhabitants were classified as "great cities". 6/ Today one would scarcely recognize the names of most of the more than 1500 such cities. During the first half of the present century, cities of a million or more inhabitants were generally recognized as very important cities. They were frequently referred to as "metropoli". Around mid-century, however, there began to develop in the developed regions what could be called "mega-cities" -- that is single agglomerations of an unprecedented size, 10 million or more inhabitants. These single agglomerations or "mega-cities" contain numerous legally distinct and independent units, each with their own administrative boundaries. However, the mega-city as viewed from the air would appear as a physically compact and continuous unit of settlement with urban density, and little or no rural territory included.

5/ Hansen, Niles M., *French Regional Planning* (Bloomington, Indiana, Indiana University Press, 1968).

6/ Adna F. Weber, *The Growth of Cities in the Nineteenth Century*, Ithaca, New York, Cornell University Press, 1963). Originally published in 1899 for Columbia University by the Macmillan Company, New York.

The evolution of the mega-city is summarized in the text table below. A detailed listing of the world's largest 35 cities and their

Date	Number of mega-cities with 10 million or more inhabitants			Approximate size of world's largest mega-city
	World	More developed regions	Less developed regions	
1950	2	2	0	10 million
1980	10	4	6	20 million
2000	25	5	20	30 million

populations at 5 year intervals between 1950 and 2000 is provided in Table 7.6 for further reference. The text table shows the number of mega-cities in existence in (1950, and 1980, and projected to be in existence in 2000). as well as their regional location. Also shown are the approximate size of the world's largest cities at each date. In 1950 only the more developed regions had mega-cities, and even so there were only two -- New York and London. At that time, 10 million inhabitants was approximately the upper limit of mega-city size that the world had ever achieved, and these were very unique occurrences, for the world's third largest mega-city (Rhine-Ruhr) had only about 7 million inhabitants. In 1980, the world has 10 mega-cities and the majority of these mega-cities are in the less developed rather than the more developed regions. The world's mega-cities are listed by name in Table 7.6. Not only has the number of mega-cities increased, but the maximum scale of these cities has doubled since 1950 from 10 million to 20 million. Both New York and Tokyo-Yokohama have a population of about 20 million, but the third largest city (Mexico City) has considerably fewer inhabitants (15.0 million). Although the majority (6 out of 10) mega-cities are situated in the less developed regions, the only two to reach the maximum size of 20 million are in more developed countries.

However, according to United Nations projections, there will be some 25 mega-cities in the world by the year 2000 and the approximate size of the world's largest mega-city will have increased by another 10 million -- from 20 million in 1980 to 30 million at the end of the century. Only one mega-city (Mexico City) is expected to reach the 30 million maximum. The second largest is expected to be Sao Paulo at 25.8 million and the

TABLE [illegible]. WORLD'S THIRTY-FIVE LARGEST AGGLOMERATIONS, RANKED BY SIZE, AND POPULATION IN MILLIONS

RANK	1950		1955		1960		1965	
1	NEW YORK-N.E.N.J.[1]	[illegible]	NEW YORK-N.E.N.J.[1]	[illegible]	NEW YORK-N.E.N.J.[1]	[illegible]	NEW YORK-N.E.N.J.[1]	[illegible]
2	LONDON	[illegible]	LONDON	[illegible]	LONDON	[illegible]	TOKYO-YOKOHAMA	[illegible]
3	RHEIN-RUHR[2]	[illegible]	TOKYO-YOKOHAMA	[illegible]	TOKYO-YOKOHAMA	[illegible]	LONDON	[illegible]
4	TOKYO-YOKOHAMA	[illegible]	RHEIN-RUHR[2]	[illegible]	RHEIN-RUHR[2]	[illegible]	RHEIN-RUHR[2]	[illegible]
5	SHANGHAI	[illegible]	SHANGHAI	[illegible]	SHANGHAI	[illegible]	SHANGHAI	[illegible]
6	PARIS	[illegible]	PARIS	[illegible]	PARIS	[illegible]	LOS ANGELES-LONG BEACH	[illegible]
7	GREAT BUENOS AIRES	[illegible]	GREAT BUENOS AIRES	[illegible]	LOS ANGELES-LONG BEACH	[illegible]	PARIS	[illegible]
8	CHICAGO-N.W.INDIANA	[illegible]	CHICAGO-N.W.INDIANA	[illegible]	GREAT BUENOS AIRES	[illegible]	GREAT BUENOS AIRES	[illegible]
9	MOSCOW	[illegible]	MOSCOW	[illegible]	CHICAGO-N.W.INDIANA	[illegible]	CHICAGO-N.W.INDIANA	[illegible]
10	CALCUTTA	[illegible]	LOS ANGELES-LONG BEACH	[illegible]	MOSCOW	[illegible]	MEXICO CITY	[illegible]
11	LOS ANGELES-LONG BEACH	[illegible]	CALCUTTA	[illegible]	OSAKA-KOBE	[illegible]	MOSCOW	[illegible]
12	OSAKA-KOBE	[illegible]	OSAKA-KOBE	[illegible]	CALCUTTA	[illegible]	OSAKA-KOBE	[illegible]
13	MILANO	[illegible]	MILANO	[illegible]	MEXICO CITY	[illegible]	CALCUTTA	[illegible]
14	GREATER BOMBAY	[illegible]	MEXICO CITY	[illegible]	PEKING	[illegible]	SAO PAULO	[illegible]
15	MEXICO CITY	[illegible]	RIO DE JANEIRO	[illegible]	MILANO	[illegible]	PEKING	[illegible]
16	PHILADELPHIA-N.J.	[illegible]	GREATER BOMBAY	[illegible]	RIO DE JANEIRO	[illegible]	RIO DE JANEIRO	[illegible]
17	RIO DE JANEIRO	[illegible]	PHILADELPHIA-N.J.	[illegible]	SAO PAULO	[illegible]	MILANO	[illegible]
18	DETROIT,MICH.	[illegible]	SAO PAULO	[illegible]	GREATER BOMBAY	[illegible]	GREATER BOMBAY	[illegible]
19	NAPOLI	[illegible]	PEKING	[illegible]	PHILADELPHIA-N.J.	[illegible]	CAIRO GIZA IMBABA	[illegible]
20	LENINGRAD	[illegible]	DETROIT,MICH.	[illegible]	DETROIT,MICH.	[illegible]	PHILADELPHIA-N.J.	[illegible]
21	MANCHESTER	[illegible]	CAIRO GIZA IMBABA	[illegible]	CAIRO GIZA IMBABA	[illegible]	DETROIT,MICH.	[illegible]
22	BIRMINGHAM	[illegible]	LENINGRAD	[illegible]	TIENTSIN	[illegible]	TIENTSIN	[illegible]
23	SAO PAULO	[illegible]	TIENTSIN	[illegible]	LENINGRAD	[illegible]	LENINGRAD	[illegible]
24	CAIRO GIZA IMBABA	[illegible]	NAPOLI	[illegible]	SEOUL	[illegible]	SEOUL	[illegible]
25	TIENTSIN	[illegible]	MANCHESTER	[illegible]	HONG KONG	[illegible]	[illegible]	[illegible]
26	BOSTON, MASS.	[illegible]	BIRMINGHAM	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
27	SHENYANG	[illegible]	BOSTON, MASS.	[illegible]	[illegible]	[illegible]	HONG KONG	[illegible]
28	WEST BERLIN	[illegible]	SHENYANG	[illegible]	[illegible]	[illegible]	SAN FRANCISCO-OAKLAND	[illegible]
29	PEKING	[illegible]	SAN FRANCISCO-OAKLAND	[illegible]	BOSTON, MASS.	[illegible]	[illegible]	[illegible]
30	SAN FRANCISCO-OAKLAND	[illegible]	HONG KONG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
31	LEEDS-BRADFORD	[illegible]	WEST BERLIN	[illegible]	[illegible]	[illegible]	BOSTON, MASS.	[illegible]
32	GLASGOW	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
33	HAMBURG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
34	WIEN	[illegible]	MADRID	[illegible]	[illegible]	[illegible]	MADRID	[illegible]
35	HONG KONG	[illegible]	CHUNGKING	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

RANK	1970		1975		1980		1985	
1	NEW YORK-N.E.N.J.[1]	[illegible]	NEW YORK-N.E.N.J.[1]	[illegible]	NEW YORK-N.E.N.J.[1]	[illegible]	TOKYO-YOKOHAMA	[illegible]
2	TOKYO-YOKOHAMA	[illegible]	TOKYO-YOKOHAMA	[illegible]	TOKYO-YOKOHAMA	[illegible]	NEW YORK-N.E.N.J.[1]	[illegible]
3	[illegible]	[illegible]	[illegible]	[illegible]	MEXICO CITY	[illegible]	MEXICO CITY	[illegible]
4	LONDON	[illegible]	MEXICO CITY	[illegible]	[illegible]	[illegible]	SAO PAULO	[illegible]
5	LOS ANGELES-LONG BEACH	[illegible]	LOS ANGELES-LONG BEACH	[illegible]	SAO PAULO	[illegible]	SHANGHAI	[illegible]
6	[illegible]	[illegible]	SAO PAULO	[illegible]	LOS ANGELES-LONG BEACH	[illegible]	[illegible]	[illegible]
7	MEXICO CITY	[illegible]	LONDON	[illegible]	[illegible]	[illegible]	RIO DE JANEIRO	[illegible]
8	PARIS	[illegible]	[illegible]	[illegible]	RIO DE JANEIRO	[illegible]	LOS ANGELES-LONG BEACH	[illegible]
9	GREAT BUENOS AIRES	[illegible]	[illegible]	[illegible]	GREAT BUENOS AIRES	[illegible]	GREAT BUENOS AIRES	[illegible]
10	SAO PAULO	[illegible]	GREAT BUENOS AIRES	[illegible]	[illegible]	[illegible]	CALCUTTA	[illegible]
11	CHICAGO-N.W.INDIANA	[illegible]	PARIS	[illegible]	PARIS	[illegible]	PARIS	[illegible]
12	OSAKA-KOBE	[illegible]	RIO DE JANEIRO	[illegible]	OSAKA-KOBE	[illegible]	OSAKA-KOBE	[illegible]
13	[illegible]	[illegible]	OSAKA-KOBE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
14	MOSCOW	[illegible]	CHICAGO-N.W.INDIANA	[illegible]	CALCUTTA	[illegible]	GREATER BOMBAY	[illegible]
15	[illegible]	[illegible]	CALCUTTA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
16	CALCUTTA	[illegible]	MOSCOW	[illegible]	GREATER BOMBAY	[illegible]	[illegible]	[illegible]
17	GREATER BOMBAY	[illegible]	GREATER BOMBAY	[illegible]	CHICAGO-N.W.INDIANA	[illegible]	[illegible]	[illegible]
18	MILANO	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	CAIRO GIZA IMBABA	[illegible]
19	CAIRO GIZA IMBABA	[illegible]	CAIRO GIZA IMBABA	[illegible]	CAIRO GIZA IMBABA	[illegible]	CHICAGO-N.W.INDIANA	[illegible]
20	[illegible]	[illegible]	MILANO	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
21	PHILADELPHIA-N.J.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
22	DETROIT,MICH.	[illegible]	PHILADELPHIA-N.J.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23	[illegible]	[illegible]	DETROIT,MICH.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
26	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
29	HONG KONG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
30	SAN FRANCISCO-OAKLAND	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
31	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
32	[illegible]	[illegible]	HONG KONG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
33	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
34	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	DETROIT,MICH.	[illegible]
35	MADRID	[illegible]	[illegible]	[illegible]	MADRID	[illegible]	PHILADELPHIA-N.J.	[illegible]

RANK	1990		1995		2000	
1	TOKYO-YOKOHAMA	[illegible]	MEXICO CITY	[illegible]	MEXICO CITY	[illegible]
2	MEXICO CITY	[illegible]	TOKYO-YOKOHAMA	[illegible]	SAO PAULO	[illegible]
3	NEW YORK-N.E.N.J.[1]	[illegible]	SAO PAULO	[illegible]	[illegible]	[illegible]
4	SAO PAULO	[illegible]	NEW YORK-N.E.N.J.[1]	[illegible]	TOKYO-YOKOHAMA	[illegible]
5	SHANGHAI	[illegible]	SHANGHAI	[illegible]	NEW YORK-N.E.N.J.[1]	[illegible]
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	RIO DE JANEIRO	[illegible]	RIO DE JANEIRO	[illegible]	RIO DE JANEIRO	[illegible]
8	LOS ANGELES-LONG BEACH	[illegible]	GREATER BOMBAY	[illegible]	GREATER BOMBAY	[illegible]
9	GREATER BOMBAY	[illegible]	CALCUTTA	[illegible]	[illegible]	[illegible]
10	CALCUTTA	[illegible]	LOS ANGELES-LONG BEACH	[illegible]	[illegible]	[illegible]
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	GREAT BUENOS AIRES	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13	[illegible]	[illegible]	GREAT BUENOS AIRES	[illegible]	[illegible]	[illegible]
14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15	PARIS	[illegible]	[illegible]	[illegible]	GREAT BUENOS AIRES	[illegible]
16	CAIRO GIZA IMBABA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19	CHICAGO-N.W.INDIANA	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
22	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
25	[illegible]	[illegible]	CHICAGO-N.W.INDIANA	[illegible]	[illegible]	[illegible]
26	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
29	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
30	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
31	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
32	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
33	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
34	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
35	MADRID	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[1] New York - Northeastern New Jersey.

[2] Rhein-Ruhr is an urban agglomeration in the Federal Republic of Germany which has been described as a "region of urban [illegible]". It is a conglomeration of numerous individual [illegible] into a larger [illegible] [illegible] through administrative [illegible]. The [illegible] of the [illegible] cities of [illegible] [illegible] [illegible] [illegible] [illegible] of the [illegible] of the agglomeration. [illegible]

third largest may be Shanghai at 23.7 million. By the end of the century the world's three largest cities will be in the developing rather than in the more developed regions, and the overwhelming majority of the world's mega-cities (20 out of 25) is expected to be in the developing regions. The mega-cities expected to be greater than 20 million in the year 2000 are: Mexico City, Sao Paula, Shanghai, Tokyo-Yokohama, New York and Beijing.

Concern over the growth of the world's largest cities as in the case of concern for urbanization in general, has resulted recently in a good deal of both theoretical and applied research. Given that much of the projected urban growth will take place in developing countries, the issue arises as to whether the urban problems of developing countries will be like those observed in developed countries. Today the argument that many developing countries are over-urbanized in relation to their economic level is generally rejected on grounds that comparisons with the developed nations or the mechanical applications of development models are a-historic and do not take into consideration the specific cultural and socio-economic conditions of individual countries. Furthermore, it remains to be seen whether and to what extent urban problems may differ in response to variations in style of development.

A second major issue concerns the relationship between size and the efficiency of cities. At this point, the optimal size of cities remains undetermined, and it is generally agreed that it is in part a function of the goals and planning objectives of governments rather than having any kind of purely objective basis independent of any political and social value considerations. At the same time, for any prevailing level of technology, there almost certainly are limits beyond which the urban agglomeration process cannot go. Moreover, the day-to-day problems of governance and administration, finance, maintenance of infrastructure and provision of services clearly will set practical limits to megalopolitan growth. The issue is an important one because information about it is essential to any assessment of whether or not cities or agglomerations in the developing countries (and in the developed countries, as well) are in fact going to reach 25 or 30 million inhabitants by the end of the century, or if some diseconomies of scale will give rise to a counter-trend toward decentralization.

The figures for the year 2000 presented above are, after all, only projections. What will actually happen by the year 2000 in both the developed and the developing regions is still uncertain. Individual agglomerations cannot expand indefinitely, particularly, where technology and investment are weak. However, even a few decades ago, the present and currently projected maximum city sizes were not generally contemplated.

It is in technologically advanced countries, where after about a century of increasing centralization in cities, some indications of decentralization have recently been found. However, the decentralization does not appear to be a consequence of any insurmountable constraints on mega-city expansion, but rather because with high technology and heavy investment in transportation and communications, it appears that constraints on decentralization are being relaxed. The division of labour that is at the core of the technology of the more developed regions necessitates close co-ordination through communication. Where transportation and communication are limited, close physical proximity in cities is an important means to maintain the necessary contact. Because of the necessary compactness of settlement, space becomes scarce and precious. But as technology and investment in transportation and communications are expanded it becomes increasingly possible to perform more and more functions at a distance from cities. In a number of the developed countries the growth of certain kinds of non-urbanized areas is increasing relative to urban areas. 7/ This may happen because of

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7/ There is a large and rapidly growing literature on this subject. See for example, the following: Calvin L. Beale, The revival of population growth in non-metropolitan America, published by the Economic Research Service, U.S. Department of Agriculture (ERS-605), Washington, D.C., June 1975; Shunichi Inoue, "Stagnant growth of Japanese major metropolitan regions in the era of post-industrial development, New Conceptual Approaches to Migration in the Context of Urbanization, a compendium of papers presented at the seminar organized by the International Union for the Scientific Study of Population's (IUSSP) Committee on Urbanization and Population Redistribution at Bellagio, Italy, 30 June - 3 July, 1978, published by the IUSSP, forthcoming in 1980; Toshio Kuroda, "Urbanization and population redistribution in Japan", Patterns of Urbanization: Comparative Country Studies, edited by Sidney Goldstein and David F. Sly, Belgium, Ordina Editions, 1977; James L. Sundquist, Dispersing Population: What America Can Learn from Europe, (Washington, D.C., The Brookings Institution, 1975); I.H. Burnley, "The urbanization of the Australian population 1947-1971" in I.H. Burnley (ed.), Urbanization in Australia: The Post-War Experience, (Cambridge University Press, 1974).

decentralized work opportunities, or the desire to own a residence in a scenic outlying location, even if it means a long commute to work in the city. It may be in part also related to the aging of the population, as older people may retire to non-urban or less urban locations, for financial reasons or because of personal preferences which can be exercised more easily when the couple is no longer bound to areas which contain appropriate work opportunities.

Finally, it may be recognized that the future course of any trend toward decentralization is likely to be influenced by basic structural changes in the economy and the social system. The precise effect of any such change are of course highly conjectural. However, to take one example, continued or increased energy scarcity might well tend to foster centralizing tendencies, as a pattern of dispersed residences imposes higher energy costs for heating and transportation. Similarly, changes in family structure, in female participation in the labour force and in fertility levels may have a significant impact on the size and location of residences most commonly desired.

PART TWO

POPULATION AND DEVELOPMENT

In addition to surveying the world population situation, this report will examine a number of special topics on the relationships between contemporary demographic trends and socio-economic development. The following chapters attempt to define more clearly the complex interactive network of linkages between the two by treating development as both a determinant and a consequence of population change. The chapters include studies of the association between fertility, mortality and socio-economic variables, the developmental aspects of mortality differentials, the causes and consequences of internal migration in developing countries, the determinants of labour force participation, with special emphasis on the demographic characteristics of working women, the demographic aspects of changes in levels and patterns of consumption, the potential population supporting capacity of agricultural land and the disparities associated with socio-demographic development.

That socio-economic disparities may be important factors in explaining disparities in rates of population growth was demonstrated in a cross national regression analysis. The findings indicate that much of the difference between developing nations with regard to their crude birth rates (CBR), gross reproduction rates (GRR) and life expectancy at birth can be explained in terms of differences in indicators of education, status of women, GDP *per capita*, income distribution and rural-urban distribution of the population. When all variables are considered, a greater portion of the variance can be explained in the case of mortality than in the case of fertility. However, this study points to a stronger role for economic variables in the determination of fertility than mortality. In particular there is an indication that the distribution of income may be more important than the level of GDP *per capita* as a determinant of fertility.

From the viewpoint of policy formation, a knowledge of differentials in mortality provides a basis for measuring health inequalities among and within communities and for identifying those population groups whose lives can be improved through changes in health and other developmental policies. Unfortunately data on differentials in mortality are scarce. This is particularly true in the case of the countries of Africa. Nevertheless the available information points to large differentials in mortality both among and within the countries of the developing and developed world.

Research studies in developing countries have established that differentials in early childhood mortality are associated with the educational levels of the mother, but little evidence is available to identify the means by which maternal education influences the complex of factors which determine the level of infant and child mortality. Differentials in mortality also exist among adults but they do not appear to be as large as those among children.

Within the developed countries it appears that differentials in mortality by social class are large and persistent. However it is difficult to identify the cause of these differentials because data are rarely available by cause of death as well as social class.

In considering mortality and morbidity it is important to remember that health is not only a desirable goal in itself; it is also an indispensable component of social and economic development. Conversely the attainment of health targets depends on social and economic progress. That this progress has not been satisfactory is reflected in the fact that about 800 million people in the developing world have incomes too low to ensure basic nutrition and access to essential health services.

Among the most important interactions between health and development are those where population growth and change are intermediate variables. Health status will affect the age distribution and a change in the age distribution will in turn alter the demand for health services. Family planning is one of the most important operational elements in programmes to reduce rates of population growth; programmes, which can also enhance the health of mothers and infants. Conversely a sharp decline in early childhood mortality rates is often a pre-requisite for lowering fertility rates.

Like health activities, rural-urban migration is an essential component of the modernization process. However, current rates of rural-urban migration may be excessive. Since the reasons for migrating can be traced to the difference between rural and urban living standards, a number of policy options are open to governments wishing to moderate the flow. But first it is necessary to decide whether or not intervention is warranted.

Migrants generally find employment, improve their living standards and even earn a surplus which they can then remit to their areas of origin. However the consequences of out-migration from the viewpoint of the rural areas are more ambiguous. Theoretical constructs point to gains and losses and empirical studies in this regard are inconclusive. Thus the question of whether rural-urban migration is beneficial or harmful to rural development remains to be resolved.

It is often hypothesized that, due to rural-urban migration, urbanization has outpaced industrialization in much of the developing world. However, most studies question the view that migrants cause urban unemployment. If the migrants are in prime working ages and bring useful skills, they will benefit the areas of destination.

The demographic effects of migration are more definite. Although migrants tend to have higher fertility than the general urban populace, their fertility is lower than comparable persons who remain in the rural areas. It is thus possible that increased rural to urban migration will reduce the fertility level of the nation as a whole.

The size of the labour force is determined by the size and age sex composition of the population and the proportions of the various groups who are economically active. In low income agrarian countries, most people contribute to subsistance from an early age and most men spend their adult years in the labour force. However, the situation is more complex in regard to women. In developing countries, a number of very different patterns emerge, involving both high and low participation rates in rural and urban areas. The participation of women appears to decline initially then rise with industrialization. And there is a variety of age profiles of female labour force participation.

Among the socio-economic determinants of female activity rates are the industrial-occupational structure and the level of aggregate demand. Though the causal process is not certain, empirical studies tend to confirm a positive relationship between indices of education and the probability of labour force participation.

In addition to economic and social factors, demographic factors such as fertility and migration are significant determinants of female labour force participation rates. It has long been hypothesized that there is a strong inverse relationship between fertility and female activity rates. This view has recently received further empirical support from comparative analyses of data from the World Fertility Survey.

Migration also affects the labour force participation of women. The departure of men from rural areas tends to increase female participation in agriculture. Since migration generally takes place for economic reasons, all migrants, including females, tend to have higher participation rates than non migrants. Furthermore, population mobility can be expected to re-allocate labour from areas where there are relatively few employment opportunities to areas where more labour is required.

In general a woman's current work status is related to her demographic characteristics, including her age, current marital status and the age of her youngest living child. This is demonstrated by data on womens work histories derived from the World Fertility Survey. Based on seven Asian and three Latin American countries, the results point to three patterns. In some countries a substantial proportion of women work prior to their marriage. In other countries work experience is reasonably high both before and after marriage. In still others, few women are recorded as working under any circumstances.

In most countries, current work rates rise with age. This is closely linked to the fact that current work rates are also higher for women whose youngest child is older. Furthermore, it is usually the case that instances of females working away from home is negatively associated with the number of children because in such cases work and child rearing are more difficult to reconcile.

Clearly, socio-economic changes are the effects as well as the determinants of demographic trends. From the point of view of planning, changes in the composition of consumption expenditures are among the more significant consequences of alterations in the population. An analysis of household expenditure patterns, discussed below, reveals that in addition to the level of total expenditure per household, the proportion spent on food and non-food items will depend on household size and composition as well as its urban-rural location. A decrease in family size will decrease the proportion of total expenditure going to food. Conversely urban families will devote a larger proportion of their total expenditure to non-food items than food items. This information can be used to project future levels and patterns of consumption and identify the proportion of changes associated with specific socio-economic and demographic variables. A simulation model based on data for Pakistan and the Philippines indicates that demographic factors are very important in explaining shifts in the composition of consumption expenditures and therefore planners should give greater weight to these factors in projecting future levels and patterns of consumption.

Despite major advances in agricultural technology, hunger continues to affect at least 500 million people. Projections indicate that almost 50 per cent more food must be grown in the year 2000 to maintain even the present inadequate nutritional levels. However the ability of a nation to produce food in perpetuity is limited by soil and climate as well as by the crop planted and the technology employed. Accordingly there are critical levels of population that can be fed from any specific land area.

The FAO and UNFPA in collaboration with the International Institute for Applied Systems Analysis has initiated a project to quantify the limits of long term food producing (population supporting) capacity. The results for the countries of Africa are presented herein.

Population supporting capacities were calculated for each climatic zone and totalled at the country level to arrive at country potentials which were then compared with present population data and the United Nations medium variant population projection for the year 2000. This procedure was used to identify countries where land resources are insufficient to supply the food needs of present or projected populations. The computations indicate that the African continent as a whole has sufficient land for self-sufficiency, given only a low level of inputs, and could feed 50 per cent more people than are projected for the year 2000. However this would require a massive movement of food or population between and within countries because of extreme differences in land resources.

Despite the rapid growth in the Gross Domestic Product (GDP) of the developing countries during the period between 1960 and 1975, the disparity between rich and poor nations measured in terms of per capita GDP has increased. Measured in 1970 prices, the gap between the developing and developed economies grew from $ 1,425 per capita in 1960 to $ 2,417 in 1975, with the result that the 34 economically more developed countries, with but 28 per cent of total population, accounted for 80 per cent of the world's GDP in 1975. Furthermore these inequalities are closely paralleled by disparities in energy consumption and levels of health and education.

When countries are grouped by per capita GDP there appears to be a consistent association between that variable and basic demographic indicators. All but a few countries with a GDP per capita below $ 350 in 1975 had a total fertility rate (TFR) above 5.0. On the other hand all countries except Ireland, Israel and certain oil exporting nations which had a per capita GDP above $ 1,400 had a TFR below 2.5. All but a few countries having a per capita GDP in excess of $ 1,400 had life expectancies at birth exceeding 70 years and with but one exception, Sri Lanka, countries with a per capita GDP below $ 200 had life expectancies at birth of less than 55 years.

Though demographic factors alone are not sufficient to explain observed disparities in levels and changes in GDP per capita and other indicators of well being, the findings presented below are generally consistent with the view that socio-economic disparities both perpetuate and are perpetuated by high fertility and rapid population growth. The pattern of socio-economic and demographic change indicates that economic disparities between nations might have been narrowed between 1960 and 1975 had population increased less rapidly in developing countries.

Chapter 8

RELATIONSHIP BETWEEN FERTILITY, MORTALITY AND SOCIO-ECONOMIC VARIABLES IN LESS DEVELOPED COUNTRIES

Many nations are concerned with devising socio-economic policies and programmes which will serve to reduce levels of fertility and mortality, thus completing a process of demographic transition from high to low levels of fertility and mortality and thereby achieving a more desirable age structure. Conceptual analyses suggest that socio-economic and demographic factors are linked by an intricate network of extremely complex relationships. In part because of this complexity and in part because of inadequate data it has not been possible to fully sort out the direct and indirect demographic effects of alternative socio-economic policies.

Full scale cross-national studies have been impeded by the absence of the necessary observations for many developing countries. As a preliminary step, a study was undertaken by the United Nations Population Division which involved an analysis of the association between the levels and trends in fertility and the levels and trends of 12 social and economic variables during the period 1960 to 1975. [1] The analysis was done for 49 countries and involved only simple correlations between the Gross Reproduction Rate (GRR) and 12 socio-economic variables. The present study will analyze the relationships between levels of fertility, mortality and ten socio-economic variables for a larger group of developing countries (85) with the purpose of determining the strength of the observed associations between the socio-economic variables and both fertility and mortality.

This study is divided into two sections. In the first, simple linear correlations will be calculated in order to measure the degree of association between the variables. In the second part multiple regression analysis is used to determine the degree to which alternative combinations of socio-economic factors are associated with levels of fertility and mortality. The choice of variables to be used in the second phase of the study will be guided by the results of the first phase.

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[1] Report on Monitoring of Population Trends, (E/CN.9/XX/CRP.1), Chapter 8, pp. 369-389. The 12 social and economic variables included two mortality variables: life expectancy at birth and infant mortality rate.

A. The choice of variables

The variables included in this study were chosen on the basis of a hypothesized causal linkage with fertility and mortality, subject to the availability of appropriate data.

Two indicators of fertility were utilized in this study, the crude birth rate (CBR) and the gross reproduction rate (GRR). The former is the fertility indicator for which data are most widely available. Furthermore it has the advantage of not being distorted by age mis-statements. However, the crude birth rate is not a pure fertility variable, since it is the resultant of the interaction between fertility and age structure. It can therefore be misleading as an indicator of fertility differentials when age structure is not uniform among the countries being studied.

The other fertility indicator being considered, the gross reproduction rate,is independent of age structure and in this sense better suited for a study of the correlates of fertility. The major difficulty associated with using this measure is that it must be computed from data on fertility classified by the age of the mother. Often those data are not available in developing countries or, when available, are distorted by mis-statements of maternal age.

Two indicators of mortality were considered, life expectancy at birth (e_0^o) and the infant mortality rate (IMR). Both measures reflect the force of mortality without being dependent on age structure. The crude death rate (CDR) was not used because it is significantly influenced by age structure. 2/ Life expectancy at birth is generally recognized as the best summary measure of mortality conditions in a country. However, this measure can be distorted by mis-statements of age and is extremely sensitive to differences in infant and child mortality.

2/ For example, Austria had a female crude death rate equal to 12.4 per thousand for an expectation of life at birth equal to 75.1 years while at the same time Hong Kong, which had a nearly identical expectation of life at birth, 75.0 years, had a female death rate equal to only 4.5 per thousand. On the other hand the coloured population of South Africa had a female crude death rate very similar to that of Austria, 12.3, but had an expectation of life at birth of only 55.8 years. Population Index, April 1979, Vol. 4, No. 2, pp. 350-353.

The infant mortality rate refers only to deaths of children under one year of age and thus fails to reflect all other mortality differentials among countries. Furthermore reliable estimates for infant mortality are usually more difficult to get than for life expectancy at birth. But unlike the latter measure of mortality, the infant mortality rate is less sensitive to mis-statements of age.

The explanatory variables used in this study fall into four broad categories. They are indicators of education, the status of women, incomes and urban-rural distribution.

Education

Two indicators of education were utilized, the proportion literate among the total population aged 15 years and over and the school enrollment ratio at the first and second levels.

The first of these indicators, the proportion of the population over 15 that is literate, measures in a very crude way the level of education of the adults in a country. This factor should affect levels of fertility because literate parents may perceive the cost of children to be higher and may have greater knowledge of methods of family planning. For these reasons it is to be expected that there is a negative relationship between levels of fertility and levels of adult literacy. 3/

Since literate persons are more likely to be aware of effective health practices and are more likely to have the financial resources to purchase health services, it is to be expected that there would also be a negative relationship between levels of mortality and levels of adult literacy. 4/

3/ I. Ekanem, "A further note on the relation between economic development and fertility", Demography, Vol. 9, No. 3 (August 1972), pp. 383-398, F. Oechsli and D. Kirk, "Modernization and the demographic transition in Latin America and the Carribean", Economic Development and Cultural Change, Chicago, Vol. 23, No. 3 (April 1975), pp. 391-419, C.G. Drakatos, "The determinant of birth rate in developing countries: an econometric study of Greece", Economic Development and Cultural Change (Chicago), Vol.17, No. 4 (July 1969), pp. 596-603, G. Farooq and B. Tuncer, "Fertility and economic and social development in Turkey:a cross-sectional and time series study", Population Studies (London), Vol. 28, No.2 (July 1974), pp. 263-276.

4/ S. Hashmi, "Socio-economic determinants of mortality levels in Asia and the Pacific", Proceedings of the Meeting on Socio-Economic Determinants and Consequences of Mortality, (Mexico City, El Collegio de Mexico, 1979),pp.119-136.

The school enrollment ratio measures the proportion of the children of both sexes of primary and secondary school age who actually attend school. School attendance may affect fertility because it may represent a direct economic cost to the parents as well as a loss of the productive services of the child. Therefore parents who send their children to school may desire fewer children. Furthermore, school attendance may result in a delayed age of marriage. For these reasons it is expected that the relationship between school enrollment and fertility is inverse. 5/

The relationship between school enrollment and mortality is less direct. However it is reasonable to expect that parents having a greater investment in their children would have the means and incentive to provide them with better medical care and nutrition. Furthermore, it is reasonable to believe that adult literacy is closely associated with school enrollment of children. Because of these indirect and direct relationships it is expected that there is an inverse relationship between the enrollment ratio and mortality. 6/

Status of women

Four indicators of the status of women were utilized, the ratio of the proportion of females literate to the proportion of males literate aged 15 years and over, the ratio of the female school enrollment ratio to the male school enrollment ratio, the proportion of the women aged 15 to 19 ever married, and the proportion of women within the non-agricultural economically active population.

In recent years the status of women has been recognized as an important determinant of fertility. 7/ If women can achieve high status in society by means other than having children, fertility may be reduced. Since maternal and infant mortality is directly related to fertility, it is expected that there would be an inverse relationship between mortality and the indicators of female status.

5/ F. Oechsli and D. Kirk, loc. cit., P. Boyer and A. Richard, "Elements d'analyse de la transition demographique", Population (Paris), Vol. 30, Nos. 4 and 5 (July to October 1975), pp. 825-847.

6/ S. Hashmi, loc. cit.

7/ United Nations, World Population Plan of Action, adopted by the World Population Conference, Bucharest, 1974, para 32 (b).

Since most modern contraceptive methods are female oriented, it is to be expected that for any given level of general literacy, societies with higher levels of female literacy will have lower fertility. The higher level of female literacy would also indicate a higher level of opportunity cost associated with child rearing. For these reasons it is expected that fertility will be inversely related to the ratio of the proportion of females literate to the proportion of males literate among persons over 15 years of age.

Since the age at first marriage is generally higher for males than for females, secondary school enrollment is likely to be a more important factor in delaying the marriage of females than males. Furthermore there is a direct relationship between current female school enrollment and female literacy. Thus for any given overall school enrollment ratio it is expected that fertility would be negatively associated with the ratio of the female school enrollment rate to the male school enrollment rate.

The proportion of women aged 15 to 19 ever married is both an indicator of the status of women and a direct factor influencing levels of fertility. When this proportion is high, marriage takes place at an early age, often without the informed consent of the young woman. In addition, since a younger age at marriage implies an earlier onset of sexual activity, it is to be expected that fertility will vary directly with the proportion of women aged 15 to 19 ever married. 8/

The proportion of the non-agricultural economically active population who are women is an indicator of the relative participation of females in the modern or market sectors of the economy. Since it is more difficult to combine child rearing with work in the modern sector, women engaged in non-agricultural activities are likely to perceive children as having a higher opportunity cost. Furthermore women in this sector are more likely to have access to family planning information and services. For these reasons it is expected that the relationship between fertility and the proportion of women within the non-agricultural population would be inverse. 9/

8/ G. Farooq and B. Tuncer, loc. cit.

9/ Ibid.

Income

Two types of income variables were used in this analysis, they are Gross Domestic Product (GDP) per capita and the share of income received by the poorer 40 per cent of the population.

Since children are a source of satisfaction and may also provide services and old age security, it is reasonable to assume that families with higher incomes would choose to have more children as well as more material possessions. On the other hand persons with higher incomes may have higher aspirations for their children, involving significantly greater costs to the parents. Furthermore high income families are more likely to have access and the means to acquire modern methods of contraception. Thus the direction of the relationship between fertility and GDP per capita cannot be determined on the basis of a priori analysis. 10/

The relationship between GDP per capita and mortality is less ambiguous. Persons with higher incomes are likely to have better nutrition, more sanitary living conditions and greater access to modern health services, both preventative and curative, than persons with lower incomes. Thus it is to be expected that there would be an inverse relationship between GDP per capita and mortality. 11/

The share of income received by the poorer 40 per cent of the population is an indicator of the inequality of the distribution of income within a country. For any given level of GDP per capita a higher level of this indicator implies a higher average level of income for the poorer 40 per cent of the population. If the relationship between fertility and income per capita is inverse but non linear, then a lower level of fertility can be expected from a given level of per capita GDP, if it is

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10/ D. Heer, "Economic development and fertility", Demography, Vol.3, No.2 (1966), pp. 423-444, F. Oechsli and D. Kirk, loc. cit., P. Boyer and A. Richard, loc. cit.

11/ S. Preston, Mortality Patterns in National Populations, (New York, Academic Press 1976), pp. 62 - 88.

more equally distributed.[12] For this reason it is expected that the relationship between fertility and the share of income received by the poorer 40 per cent of the population will be inverse.

Much evidence has been advanced to demonstrate that the relationships between per capita income and various causes of death are non-linear.[13] Thus for any given level of per capita income, lower levels of mortality are likely to be associated with a greater portion of income going to the poorer 40 per cent of the population, implying a negative relationship between the variables.

Urban-rural distribution

Two indicators of the rural-urban distribution of the population were used. They are the proportion of population living in urban areas and the proportion of economically active males engaged in non-agricultural activities.

Families living in urban areas are less likely to be able to derive productive services from children and are more likely to be engaged in occupations which conflict with the demands of child rearing. Thus the net cost of children is likely to be higher in urban areas. Furthermore urban families are likely to have easier access to contraceptive information and services. Therefore it is expected that the relationships between fertility and the proportion of the population living in urban areas will be inverse.[14]

The relationship between the proportion of the population which is urban and mortality is more ambiguous. Urbanization may be associated with a variety of environmental problems and may facilitate the spread of communicable diseases. However urban populations are likely to have easier access to health information and health services; and this is especially true in developing countries. For this reason it is expected that the direction of the relationship between the proportion of the population which is urban and levels of mortality is inverse. 15/

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[12] R. Repetto, Economic Equality and Fertility in Developing Countries, (Johns Hopkins University Press, Baltimore, 1979), p. 54.

[13] S.H. Preston, op. cit., Chapter 2.

[14] I. Ekanem, loc. cit., C.G. Drakatos, loc. cit.

The proportion of active males engaged in non-agricultural activities is an indicator of the distribution of the population between rural and urban areas on the assumption that occupation is highly correlated with location. Since it is easier to employ children in agricultural than many non-agricultural activities, the value of children and hence fertility should be inversely related to the proportion of active males engaged in non-agricultural activities. 16/ For reasons cited in relation to the proportion of the population which is urban it is expected that the relation between mortality and the proportion of economically active males engaged in non-agricultural activities is negative. 17/

The Data

To the greatest extent possible, especially with regard to demographic variables, this study uses data based on actual observations to the exclusion of data based on projections or models. For this reason the number of countries for which appropriate data was available was often quite small. The number of countries for which data on a particular variable was available ranged from a maximum of 85 countries in the case of the Crude Birth Rate (CBR) to a minimum of 39 countries in the case of the share of GDP going to the poorer 40 per cent of the population.

Though the data are generally drawn from United Nations publications, it must be kept in mind that their quality and reliability are uneven. It should also be noted that the data do not all refer to the same year. For all variables and all countries the data include the observation which is closest to the year 1975. In some cases the observation may date as far back as the early 1960's. This fact is especially important to consider in view of numerous studies indicating that there has been a structural change in the relationships between socio-economic variables and fertility and mortality in recent decades. 18/

15/ S. Hashmi, loc. cit.

16/ A.M. Guest, "The relationship of the crude birth rate and its components to social and economic development", Demography, Vol. 11, No. 3, (August 1974), pp. 457-472.

17/ S. Hashmi, loc. cit.

18/ S.H. Preston, op. cit., Chapter 4.

Table 8.1 indicates the number of countries for which information was available, the average value of each variable and its standard deviation.

B. Correlation Analysis

In this section of the study the direction and degree of association between the variables will be determined by means of simple linear correlation analysis. The purpose of this exercise is to identify those variables which will be used in the subsequent regression analysis.

Correlation among the demographic variables

Two measures of fertility and two measures of mortality have been considered in this study. To the extent that there is a high degree of correlation between the indicators of fertility (or mortality) it is reasonable to assume that both could be explained by the same set of explanatory variables.

The correlation coefficients for this portion of the analysis are shown in Table 8.2 along with the number of countries involved in each computation. From this table it can be seen that the coefficient of correlation between the crude birth rate and the gross reproduction rate is .905. This results from a strong linear relation between the variables for values of the CBR below 36 and a weak relation between the variables for values of the CBR above 38. (In the case of the 14 countries whose CBR is between 48 and 50 the GRR varies between 2.5 and 3.8). This may be due to significantly different age structures but is more likely to be the result of data inaccuracy. Furthermore the degree of inaccuracy tends to be associated positively with fertility indicating a heteroskedastic relationship.

There was a high inverse correlation (-.85) between life expectancy at birth and infant mortality. This resulted from a strong linear relationship between mortality variables for countries with life expectancy higher than 38 years and a very weak one for countries with a life expectancy of 38 years or less. (The nine countries with life expectancies between 35 and 38 years had infant mortality rates varying between 100 and 230 per thousand). This may reflect the fact that differentials in child and adult mortality are more important factors in determining life expectancy in high mortality countries. Or it may simply reflect greater inaccuracy

Table 8.1. Number of countries for which data was available and average values and standard deviations of the variables

Variable		Number of Countries	Average value	Standard Deviation
Number	Name			
(1)	Crude Birth Rate (per thousand)	85	41.5	8.9
(2)	Gross Reproduction Rate	83	2.85	0.65
(3)	Life expectancy at Birth (years)	59	51.7	12.5
(4)	Infant mortality Rate (per thousand)	43	110.9	55.4
(5)	Proportion literate (per cent)	47	51.8	26.1
(6)	School enrolment ratio (per cent)	81	55.2	25.1
(7)	Female/male literate ratio (per cent)	47	64.8	33.1
(8)	Female/male school ratio (per cent)	77	74.6	24.6
(9)	Female 15-19 ever married (per cent)	64	30.6	19.9
(10)	Females in non-agricultural labour (per cent)	45	24.9	12.0
(11)	GDP *per capita* (US dollars)	70	347	303
(12)	Share of the poorer 40 per cent (per cent)	39	123	4.2
(13)	Proportion Urban (per cent)	72	33.7	21.5
(14)	Males in non-agricultural activities (per cent)	45	48.3	21.9

Table 8.2. Correlation matrix

Correlation coefficients numbers of cases		Crude birth rate (1)	Gross Reproduction rate (2)	Life expectancy at birth (3)	Infant mortality rate (4)	Proportion population 15 + literate (5)	School enrollment ratio (6)	Ratio female/male literate (7)	Ratio female/male school enrollment (8)	Proportion women 15 - 19 ever married (9)	Proportion of women in non-agricultural (10)	GDP per capita (11)	Share of the poorer 40 per cent (12)	Proportion urban (13)	Proportion of active males non-agricultural (14)
Crude Birth Rate	(1)	85 1	.90	-.76	.73	-.63	-.62	-.41	-.56	.56	-.20*	-.69	-.30	-.55	-.54
GRR	(2)	83	83 1	-.53	.58	-.55	-.51	-.37	-.46	.40	-.22*	-.57	-.42	-.41	-.49
Life expectancy	(3)	59	59	59 1	-.85	.80	.62	.72	.72	-.78	.29	.61	.18*	.72	.67
Infant Mortality	(4)	43	43	40	43 1	-.85	-.41	-.62	-.56	.74	-.54	-.42	-.29*	-.62	-.48
Proportion Literate	(5)	47	47	35	23	47 1	.55	.85	.75	-.83	.67	.30	.26*	.48	.34
School Enrollment	(6)	81	79	57	41	46	81 1	.40	.71	-.50	.20*	.71	-.12*	.60	.61
Female/Male Literate	(7)	47	47	35	23	47	46	47 1	.87	-.71	.83	.24*	.07*	.28	;11*
Female/Male School	(8)	77	75	54	40	43	77	43	77 1	-.62	.64	.57	-.31	.42	.31
Women 15 - 19 married	(9)	64	63	49	34	45	62	45	59	64 1	-.51	-.35	.01*	-.48	-.36
Women non-agricultural	(10)	45	45	35	23	40	44	40	41	42	45 1	.18*	.01*	.05*	-.14*
GDP per capita	(11)	70	69	51	38	42	68	42	64	56	38	70 1	-.06	.72	.71
Poorer 40 per cent	(12)	39	39	28	16	30	38	30	35	34	27	35	39 1	-.06*	.41
Proportion urban	(13)	72	71	52	37	47	69	47	66	61	45	60	37	72 1	.77
Males non-agricultural	(14)	45	45	35	23	40	44	40	41	42	45	38	27	45	45 1

* not significant at the .05 level.

in computing infant mortality or life expectancy in these countries. In any event the degree of variability is correlated with the level of mortality and the relationship is heteroskedastic.

The high degree of correlation between the two fertility variables and the two mortality variables respectively implies similar patterns of relationships with the socio-economic variables. However the correlation coefficients are sufficiently below 1.00 to justify studying each variable separately.

Correlation among explanatory variables

Since many socio-economic variables are highly correlated with one another, it may be possible to omit certain variables from the regression analysis without any significant loss of explanatory power. In this portion of the analysis groups of variables related to education, status of women, income and rural-urban location will be considered separately. In the case of education, data were available for 46 countries with regard to the proportion of persons above the age of 15 who were literate and the enrollment ratio in primary and secondary grades. The coefficient of correlation between the two variables was only .55. This would indicate that it may be possible to measure the separate effect of each variable on fertility and mortality.

Four indicators of the status of women were considered in this analysis. Thus six correlation coefficients relating these variables were calculated. In five of the six cases the number of countries for which data was available is between 40 and 50. (In the sixth case data were available for 59 countries). In general the ratio of female to male literacy was most closely correlated with other status of women variables. The correlation between that variable and the ratio of male to female school enrollment was .87. All other correlation coefficients were lower. However a strong case could be made for omitting one or more of the status of women variables from the regression analysis.

The two income variables used in this study were GDP per capita and the share of income going to the poorer 40 per cent of the population. Only 39 observations were available for the latter variable and only 35 observations were available for both variables simultaneously. The coefficient of correlation between them was (-.06), indicating that they are not linearly related and would therefore have separate effects on fertility and mortality.

Two indicators of rural-urban residence were used in this study. They are the proportion of the population which is urban and the proportion of the economically active males engaged in non-agricultural activities. Since only 45 observations were available for the latter variable, the correlation coefficient between the two was based on 45 observations. The value of the correlation coefficient (.77) lies in the intermediate range, indicating that though each variable is likely to have a separate effect on fertility and mortality, not a great deal of explanatory power would be lost by eliminating one of these variables.

All the correlation coefficients cited in this section are significant at the one per cent level except the coefficient relating GDP per capita and the share of income going to the poorer 40 per cent of the population.

Correlation between fertility and the explanatory variables

Since the gross reproduction rate is not influenced by differences in age structure, it might be assumed that the relationship between GRR and the socio-economic variables would be stronger than the relationship between those variables and the CBR. However this is not the case. With but one exception, the correlation coefficient between the crude birth rate and each of the socio-economic variables is equal to or larger than the correlation coefficient between the gross reproduction rate and the corresponding variable. This finding may indicate that age structure is correlated with socio-economic variables in a way which reinforces their linkage with fertility. However this finding may simply indicate that measurements of the crude birth rate are more accurate than measurements of the gross reproduction rate since random errors will tend to reduce the size of the correlation coefficient.

Though the largest correlation coefficient between the fertility indicators and the socio-economic variables is only .69, the data indicate that fertility is significantly related to all but one of the socio-economic variables and that all the correlation coefficients have the expected sign. The only variable which is weakly correlated with both the CBR and GRR (-.20 and -.22 respectively) is the proportion of women in the non-agricultural labour force.

Correlation between mortality and the explanatory variables

Since life expectancy is a more comprehensive measure of mortality, one would expect that it is more highly correlated with the socio-economic variables than is the infant mortality rate. In all but two instances this is the case. Only one variable, the share of income going to the poorest 40 per cent of the population is not significantly correlated with either mortality indicator at the 5 per cent level. Thus mortality is associated with all but one of the socio-economic variables and the correlation coefficients have the expected sign.

On the basis of simple correlation analysis it appears that mortality measures are more closely associated with socio-economic variables than are indicators of fertility. There are only two socio-economic variables for which the correlation with fertility is stronger than with mortality. One of them, income *per capita*, is the socio-economic variable most highly correlated with fertility while having one of the lowest correlations with mortality.

In the preceeding analysis comparisons of the relative magnitude of correlation coefficients were rendered suspect due to the fact that the groups of countries for which the correlation were computed varied with each pair of variables considered. Thus some of the differences between correlation coefficients were due to differences in the composition of reference groups. In order to make a more definitive comparison of the respective linkages between the demographic variables and each of the explanatory variables, a new set of correlation coefficients was computed, taking for each socio-economic variable only those countries for which information is available on all four demographic variables. The results appear in Table 8.3.

Table 8.3 indicates that, as in the previous analysis, the CBR is more highly correlated with the socio-economic variables than is the GRR. To a somewhat lesser extent life expectancy at birth is more highly correlated with the socio-economic variables than is the infant mortality rate.

Table 8.3. Correlation coefficients

Demographic variables		Socio-economic variables									
		(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	CBR	-.72	-.66	-.58	-.69	.67	-.49	-.72	-.21*	-.69	-.64
(2)	CRR	-.62	-.58	-.50	-.52	.47	-.46	-.59	-.45	-.57	-.60
(3)	e_o^o	.84	.54	.73	.71	-.85	.53	.60	.02*	.77	.58
(4)	IMR	-.86	-.39	-.79	-.64	.75	-.71	-.41	-.33*	-.62	-.46
Number of cases		21	38	21	37	33	22	36	15	34	22

* not significant at the .05 level

In order to make a valid comparison of the strength of the association between a given demographic variable and each of the socio-economic variables it is necessary to restrict the analysis to countries for which data is available on all variables involved. This is done in Table 8.4 which shows that 22 cases could be considered in relation to the CBR and GRR; 18 cases could be considered in relation to life expectancy at birth and nine cases could be considered in relation to the infant mortality rate.

A comparison of the elements of this table with the corresponding elements of the previous table indicates that, in a number of cases, the correlation coefficients vary markedly thus illustrating the importance of the composition of the sample of countries.

In this part of the analysis GDP per capita emerged as the socio-economic variable which is most highly correlated with the crude birth rate and with life expectancy at birth. The proportion of income going to the poorest 40 per cent which was not significantly correlated with the demographic variables in the previous analysis also emerged as a variable with a strong relationship with fertility. It had the largest correlation with the GRR and the third largest with the CBR.

Table 8.4. Correlation coefficients

Demographic variables		Number of cases	Socio-economic variables									
			(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	CBR	22	-.62	-.57	-.31*	-.46	.64	-.05*	-.70	-.63	-.70	-.62
(2)	GRR	22	-.63	-.49	-.34*	-.47	.55	-.09*	-.63	-.69	-.58	-.59
(3)	e^{o}_{o}	18	.73	.72	.61	.71	-.68	.41	.76	.47	.70	.58
(4)	IMR	9	-.79	-.68	-.63	-.83	.68	-.76	-.60	-.50*	-.59	-.10*

* not significant at the .05 level

C. Multiple regression analysis

In the second section of this study simple linear correlation analysis was used to estimate the gross relationship between each of the demographic and socio-economic variables, considered in pairs. However, the observed associations may have been influenced by other variables operating through the pair being analyzed. In this section of the study we shall examine the way in which the socio-economic variables as a group are related to the crude birth rate, the gross reproduction rate and life expectancy at birth. The separate effect of each variable will also be estimated by means of multi-variate analysis. Selected sets of social and economic variables will be related to the crude birth rate, gross reproduction rate and life expectancy at birth. The determinants of the infant mortality rate will not be analyzed because of the paucity of observations on that variable.

In order to increase the number of countries for which data on all social and economic variables were available, three socio-economic variables were also eliminated from the study. They are (1) the ratio of the female proportion literate to the male proportion literate, (2) the proportion of women in the non-agricultural labour force, and (3) the proportion of active males engaged in non-agricultural activities.

Single equation, linear multiple regression coefficients were estimated relating various combinations of the social and economic variables to each of the remaining demographic variables.

Data from 21 countries 19/ were used in the analysis since only these countries had observations on all the demographic and socio-economic variables. The sample is therefore not random, having been chosen on the basis of data availability, and it cannot be assumed that the coefficients calculated from these data are unbiased estimates of the corresponding relationships in all developing countries. Quite the contrary, there is reason to believe that the sample countries differ in significant ways from the majority of developing countries. Table 8.5 presents the mean values of the variables included in this study for the 21 countries. Compared to the corresponding values for the original sample, cited in Table 8.1, per capita income is 51 per cent higher; the proportion of the population in urban areas is 27 per cent higher; the school enrollment ratio is 24 per cent higher; the crude birth rate is 13 per cent lower and the life expectancy is 7 per cent higher. Taken as a whole these countries are more developed than most developing countries.

Fertility

When the seven remaining socio-economic variables are included simultaneously as independent variables, they explain (in a statistical sense) 79 per cent of the variability in the CBR and 71 per cent of the variability in the GRR. However in both cases only one regression coefficient is significant at the 5 per cent level, the one pertaining

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19/ Those countries are : Chad, Gabon, Senegal, Tunisia, Tanzania, Zambia, Costa Rica, El Salvador, Mexico, Panama, Argentina, Chile, Ecuador, Peru, Uruguay, Hong Kong, Indonesia, South Korea, Malaysia, Thailand and Turkey.

to the share of GDP going to the poorer 40 per cent of the population. This result is due to the high degree of multicollinearity in the independent variables.

Table 8.5. Mean values of the variables used in the study of fertility and mortality based on 21 developing countries

Variable	Mean Value
Crude Birth Rate (per thousand)	36.0
Gross Reproduction Rate	2.47
Life expectancy at Birth (years)	55.3
Proportion literate (per cent)	58.1
School enrollment ratio (per cent)	68.7
Female/male school ratio (per cent)	85.5
Female 15-19 ever married (per cent)	27.8
GDP per capita (US dollars)	52.3
Share of the poorer 40 per cent (per cent)	12.6
Proportion Urban (per cent)	42.8

The simple linear correlations between the independent variables are shown in Table 8.6. In general the degree of correlation between them is only moderate. However five pairs of variables produced correlation coefficients of .75 or greater. The pairs were :

1. Proportion of the population 15 years and over that is literate and the ratio of male to female school enrollment (.77).

2. Proportion of the population 15 years and over that is literate and the proportion of women 15 to 19 ever married (-.83).

Table 8.6. Simple linear correlations coefficient for the variables used in the study of Fertility and Mortality based on 21 countries

		(1)	(2)	(3)	(5)	(6)	(8)	(9)	(11)	(12)	(13)
Proportion Urban	(13)										1
Share of the poorer 40 per cent	(12)									1	.15
GDP *per capita*	(11)								1	.03	.55
Proportion of Women 15-19 ever married	(9)							1	-.26	-.15	-.75
Ratio of Female/ male school enrollment	(8)						1	-.63	.64	-.06	.56
School enrollment ratio	(6)					1	.79	-.47	.85	.09	.57
Proportion population 15 + literate	(5)				1	.48	.77	-.83	.31	.29	.63
Life Expectancy at Birth	(3)			1	.87	.48	.69	.86	.38	.27	.75
Gross Reproduction rate	(2)		1	-.55	-.47	-.51	-.46	.40	-.60	-.58	-.52
Crude Birth rate	(1)	1	.94	-.73	-.60	-.66	-.84	.63	-.68	-.40	-.69

3. The school enrollment ratio and the ratio of male to female school enrollment (.79).

4. The school enrollment ratio and per capita GDP (.85).

5. The proportion of women 15 to 19 ever married and the proportion urban (-.75).

In order to reduce the degree of multicollinearity, the elements of these pairs were not considered simultaneously in any of the regression equations. As a result the correlation coefficient between independent variables never exceeded .70.

GDP per capita is highly correlated with the school enrollment ratio but the two variables refer to quite different phenomena and therefore should be studied individually.20/ It was for this reason that separate sets of equations were calculated for each of these variables. Table 8.7 shows the beta coefficients 21/ relating GDP *per capita* and the other socio-economic variables to the crude birth rate. It clearly indicates that the beta coefficients are all significantly greater than zero and that the direction of the relationships are in accordance with *a priori* expectations. When the independent variables are considered in groups of three the highest regression coefficients are attained when the share of the poorer 40 per cent in total income is included. Furthermore, the coefficient of determination is reduced from .78 to .68 when that variable is excluded from the analysis.

Table 8.8 shows the beta coefficients relating the school enrollment ratio and other socio-economic variables to the crude birth rate. Though all coefficients have the expected sign, only the coefficients of the school enrollment ratio and the share of income going to the poorest 40

20/ It is likely that *per capita* GDP acts upon the school enrollment ratio rather than the reverse since the literacy rate which reflects previous school enrollment rates is not highly correlated with GDP *per capita*.

21/ Beta coefficients are standardized regression coefficients obtained when all variables are transformed so as to have a mean of zero and a standard deviation of unity. Beta coefficients are independent of the original units in which the variables are measured and thus their magnitude can be compared directly.

Table 8.7. Beta coefficients of the independent variables used as determinants of the Crude Birth Rate based on data for 21 developing countries (school enrollment ratio excluded)

GDP *per capita*	Share of the poorer 40 per cent of the population	Females 15-19 ever married	Proportion literate	Proportion urban	Female/ male school ratio	R^2
-.56	-.32	.44				.78
-.56	-.28		-.35			.71
-.46	-.32			-.38		.70
-.41	-.41				-.40	.70
-.55		.48				.68
-.55			-.44			.63
-.67	-.38					.60

Table 8.8 Beta coefficient of the independent variables used as determinants of the Crude Birth Rate based on data for 21 developing countries (GDP *per capita* excluded)

School Enrollment Ratio	Share of the poorer 40 per cent	Females 15-19 ever married	Proportion urban	R^2
-.55	-.40	.31*		.72
-.50	-.39		-.34*	.72
-.70	-.46			.65

*not significantly different from zero at the .05 level of significance per cent of the population are significantly different from zero.

Table 8.9 shows the results of a similar analysis using the Gross Reproduction Rate as the dependent variable. Four equations were fitted involving GDP per capita, the share of income going to the poorer 40 per cent of the population and one other socio-economic variable. The introduction of the third variable adds little to the coefficient of determination and the coefficients of those variables are not significantly different from zero. The coefficients of the first two variables were significant and had the expected sign. Two equations were fitted involving the school enrollment ratio. That variable also proved to be significantly different from zero.

Table 8.9. Beta coefficients of the independent variables used as determinants of the Gross Reproduction Rate, based on data from 21 developing countries

GDP *per capita*	Share of poorer 40 per cent	Females 15-19 ever married	Proportion Urban	Proportion Literate	Female/male school ratio	School enroll-ment ratio	R^2
-.53	-.53	.18*					.70
-.49	-.54		-.17*				.69
-.53	-.51			-.16*			.69
-.45	-.57				-.21*		.69
-.56	-.58						.67
	-.59		-.16*			-.48	.67
	-.59					-.57	.65

* not significantly different from zero at the -.05 level of significance

Though it is not possible to generalize these findings to other developing countries, the results do suggest that when the effects of other variables are taken into account, the proportion of income going to the poorest fraction of the population is significantly associated with reduced levels of fertility. This analysis does not permit the drawing of any conclusions as to cause and effect since the variables may interact with one another in a complex way or they may reflect the effects of other variables not included in this study. In any event it would seem profitable to explore further the linkage between fertility and the distribution of benefits of development among households.

Mortality

The analysis of the factors determining life expectancy at birth involved the same set of variables as was considered above. However the regression results are quite different. When all seven socio-economic variables are included in the regression equation, the coefficient of determination (R^2) is .86. Thus a large part of the variance in life expectancy between countries is "explained" by these seven variables. However due to multicollinearity, none of the Beta coefficients is significant at the 5 per cent level.

Table 8.10 shows the Beta coefficients for regression coefficients based on two or three variables. In every case the coefficients of the proportion of females 15 to 19 ever married and the proportion literate are significantly different from zero. Though these two variables can explain 82 per cent of the total variance, it must be remembered that a number of combinations of other variables explain approximately the same proportion of the variance.

C. Conclusions

The regression analysis is consistent with the results of the correlation analysis in that the socio-economic variables taken as a whole can explain a larger part of the variance in life expectancy at birth than the variance in the crude birth rate or the gross reproduction rate. The maximum coefficient of determination is equal to .86 in the case of mortality and .79 in the case of fertility when the same group of 21 countries is considered.

Table 8.10. Beta coefficient of the independent variables used as determinants of the Life Expectancy at Birth based on data for 21 countries

Females 15 - 19 ever married	Proportion literate	GDP per capita	School Enroll-ment ratio	Proportion Urban	Female/ male school ratio	Share of the poorer 40 %	R^2
-.43	.48	.2*					.84
-.43	.50		.03*				.82
-.43	.51						.82
	.67			.32			.82
-.65					29*	19*	.81

* Not significantly different from zero at the .05 level of significance.

In the case of both fertility and mortality, a number of different groupings of the socio-economic variables provide comparable results in terms of the coefficient of determination. On the basis of these data and simple regression analysis it is not possible to identify a specific linear model as being a clearly superior explanation of the relationship between socio-economic factors and fertility and mortality respectively.

The fact that a number of linear models are nearly equivalent in terms of statistical explanatory power highlights the need for new theoretical constructs which would make it possible to identify the relative importance of various socio-economic variables in explaining fertility and mortality differences.

The analysis did indicate that per capita GDP, the share of income going to the poorest 40 per cent and the school enrollment ratio were statistically significant determinants of fertility and that the proportion literate and the proportion of women aged 15 to 19 and the proportion urban were statistically significant determinants of mortality.

Though the results of this study cannot be generalized to other developing countries and the findings may be greatly influenced by the choice of a linear single equation model, the results are suggestive that overall socio-economic variables provide a better explanation of mortality than fertility. Furthermore, economic variables seem more significant in the case of fertility and social variables more significant in the case of mortality. In particular the proportion of income going to the poorer 40 per cent appears to be a significant factor in fertility but not mortality. When comparable data for the majority of developing countries becomes available, it would be useful to investigate whether these findings apply to the larger body of countries. If this should prove to be the case, it would then be useful to try to identify the specific causal links that explain these phenomena.

Chapter 9

MORTALITY DIFFERENTIALS

From both an analytic and a policy perspective, the study of differential mortality is a matter of very considerable importance. Analytically, it may aid demographic researchers, and epidemiologists, in their search for the determinants of mortality and ill health. From a policy point of view, knowledge of differentials in mortality provides a basis for measuring health inequalities among and within communities and for identifying those population groups whose lives can be improved by changes in government and health policy.

In spite of the importance of this topic for researchers and policy makers, data are scarce for developed and developing countries alike. This chapter is intended merely to assemble and summarize the information that is currently available at the United Nations on social, economic and geographical differentials. As in previous chapters, findings are discussed in separate sections for Africa, Asia, Latin America, and the developed nations.

A. Developing countries

1. Africa

(a) North Africa

The quality of information on mortality levels in Africa is the least reliable among the third world regions. Even for North Africa the information is mainly based on survey data. Of the six countries of North Africa, Egypt, Algeria, Tunisia, Libya, and Morocco have life expectancies around 50-55 years at birth, whereas for Sudan life expectancy is around 45 years. Infant mortality levels vary from 90 to 160 per thousand live births, the highest being in Morocco.

There is little existing information on differentials in mortality. Results for Algeria, the most studied of the North African countries, are presented here. A study [1] of Algerian mortality for the period 1969-71 indicated that infant mortality is highest for sparsely settled rural areas (152 infant deaths per 1000 live births) and that the rate decreases with every increase in population density reaching a low of 100 in the metropolitan zone. Within all but the sparsely settled rural category, infant mortality was lower among households with a literate head. This study also showed that the rural/urban differential is much higher for the second and third year of life than for infancy, possibly indicating higher risks due to infection, poor nutrition after weaning, and a more limited access to medical care in rural areas.

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[1] Levels and Trends in Mortality Since 1950 (United Nations publication, forthcoming 1981).

A survey 2/of infant mortality in Northern Algeria in 1969-71 classifying families by the occupation of the head of the household indicated that differences in urban infant mortality rates vary from 93 among professional and technical workers to 112 among artisans and labourers and 177 among urban farmers. Rural mortality varies from 119 among service and transport workers and 122 among vendors and office workers to over 150 among other occupational groups. Very noticeable is the high rate of infant mortality among children of all occupational groups. Even families of urban professional and technical workers exhibited infant mortality rates of 93 per thousand.

Estimates of the mortality of children aged 1 to 4 for Northern Algeria indicate similar differentials by occupation of household head.

(b) Sub-Saharan Africa

Estimates of mortality in early childhood based on retrospective data show that in the early 1970s the probability of dying in the first two years of life varies from 115 per 1000 live births in Tanzania to 316 in Sierra Leone and 347 in Malawi. However, little reliance should be placed on these figures as they are subject to various types of errors. 3/ Available figures also indicate the presence of exceptionally large regional differences in mortality within many sub-Saharan African countries. The figures in Table 9.1 indicate substantial urban/rural differences; mortality in urban Africa being substantially less than in rural areas. Data on socio-economic variations in mortality during early childhood are available for several sub-Saharan countries. The estimates for Tanzania (Table 9.2) are broadly representative of findings in other African countries. They indicate that children of mothers with 9 to 13 years of schooling have lower mortality levels than those whose mothers have had little or no education. Mortality estimates by occupation of head of the household show that the children of those working in agricultural jobs have higher mortality than other groups.

Surveys 4/ made in 1973 in the city of Ibadan and the Western and

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2/ Ibid.

3/ Ibid.

4/ J. C. Caldwell, "Education as a factor in mortality decline, an examination of Nigeria data", in Proceedings of the Meeting on Socioeconomic Determinants and Consequences of Mortality, Mexico City (Geneva, 1979).

Table 9.1. Estimated numbers of childhood survivors during the first two years of life, and associated infant mortality rates and life expectancies at birth.

Region, Country, Date, Area type	Estimated survivors at age 2 of each 1000 live births	Associated infant mortality rate $(1000\ q_o)$	Estimated life expectancy at birth, in years (e_o)
EASTERN AFRICA			
Kenya			
Nairobi (1962)	890	90	54
Provincial Average (1962)	825	140	45
Nairobi (1969)	905	80	57
Provincial Average (1969)	880	110	50
Tanzania			
Large Urban/rural range (1973)	920/880	60/100	61/52
WESTERN AFRICA			
Ghana			
Urban/rural range (1968-69)	-	100/150	51/41
Urban/rural range (1971)	-	95/130	53/45
Ivory Coast			
1st agricultural sector (1957-58)	760	180	37
Abidjan (1963)	770	180	37
Liberia			
Urban/rural range (1971)	-	125/170	46/44
Senegal			
Rural (1962-68)	638	220	29
Dakar (1964-65, 1968)	-	75	59
Togo			
Lomé (1961)	-	115	48
Rural average (1961)	720	210	33
Upper Volta,			
Rural (1960)	-	200	45
Ouagadougo (1961-62) (Urban)	-	130	34

Source: Levels and Trends in Mortality Since 1950, op. cit.

Table 9.2. Child **mortality according to characteristics of Parents.** Tanzania, 1973.

Years of Mother's Education	Probability of Dying (x1000) before Age 2[1]	3[2]	5[3]
0	113	126	151
1-4	106	107	131
5-8	83	59	74
9-13	41	29	28
Occupation of Household Head			
Professional	80	62	75
Clerical/Sales	82	85	118
Other Non-agricultural	101	100	135
Agricultural self-employed	114	128	150
Agricultural paid	94	118	169

Source: Howard R. Hogan and Shiraz Jiwani, "Differential mortality", in Tanzania, Bureau of Statistics, and University of Dar Es Salaam, The Demography of Tanzania: An Analysis of the 1973 National Demographic Survey of Tanzania, by Roushdi A. Henin, Douglas Ewbank and Howard Hogan, eds., 1973 Demographic Survey of Tanzania, vol. 6 (Dar es Salaam, 1976?), pp. 212-213.

[1] Based on reports of women aged 20-24.

[2] Based on reports of women aged 25-29.

[3] Based on reports of women aged 30-34.

Lagos States of Nigeria confirm the strong differentials in child mortality by mother's educational levels but they also show that father's occupation has a significant impact on mortality.

Examination of data from this same survey 5/ indicate that residence too has an impact on child mortality, even when controlled for mother's educational level. Children of mothers with primary school education have a child mortality rate of 37 in the cities of Ibadan and Lagos relative to 51 in the villages while the corresponding figures for mothers with secondary or higher education is 25 and 46. Mortality in the two cities among children of mothers who are not educated is higher than or similar to that in the village. The differentials would seem to indicate either a lack of medical services or the presence of some other factor affecting mortality in the rural setting, which has an effect even among children born to mothers who have secondary or higher education. However differences in mortality by mother's educational level were the largest revealed in the survey and were not substantially diminished by controlling for such factors as type of marriage, father's occupation, father's education, family planning practice, and urban/rural residence. Dynamics in family relationships which result in greater power to the wife and thus the ability to challenge traditional practices of child care, as well as increasing child-centredness by educated mothers, have been suggested 6/ as reasons for the strong relation between maternal education and child mortality.

A report 7/ reviewing studies of the relation between mother's level of education and infant and child mortality has provided the following summary on educational differences in early childhood mortality in Africa.

5/ Ibid.

6/ Ibid.

7/ Susan H. Cochrane, Educational Differences in Mortality of Children, World Bank, April 1980 (mimeographed paper).

The proportion of children ever-born dying by age 2 for a number of African countries classified by mother's level of education

Country	Mother's level of education		
	No education	Primary education	Upper primary and above
Gambia (1973)	.275	.194	.118
Zambia *	.174	.164	.093
Ethiopia*	.179	.137	.012
Sierra Leone*	.217	.137	.103
Ghana (1971)	.106	.148	.102

* No date available.
Source: Susan H. Cochrane, ibid.

Except for the data on Ghana, significant differentials in early childhood mortality by mother's level of education are indicated.

2. Asia

National mortality levels in Asia vary widely with Hong Kong having the highest expectation of life, 73 years, and Singapore, Kuwait and Israel all having life expectancies over 65. Figures for China also indicate a substantial mortality decline. At the other extreme, countries such as Indonesia, Afghanistan, Bangladesh, India, and Nepal all have life expectancies under 50 years. These differences in the main reflect a great disparity in mortality during infancy and in early childhood. Infant mortality varies from 12.0 per 1000 in Singapore, and Hong Kong, to an estimated level of over 200 in Afghanistan. Child mortality too varies from between 1 to 1.5 per 1000 in Hong Kong and Singapore, to between 4 to 6 in Malaysia and Sri Lanka and above 25 in Bangladesh, India and Afghanistan. 8/

Data for several countries indicate the presence of urban/rural or regional differences. In India data from the sample registration system 9/ indicate that around 1970 the average level of infant mortality in the rural areas in the sample was about 50 per cent higher than in urban areas. However the urban rate in some states was higher than that in rural areas in other states. The recorded urban rates range from 11 to 134 per 1000 births and the rural rates ranged from 27 to 173. No studies are available which explain the urban/rural differentials within a state. However, one factor, among many others, could well be urban/rural differentials in the availability of health services. For example, for India as a whole there was one physician per 1,400 people in urban areas while the corresponding figure for rural areas was one per 12,000. Estimates 10/ available for Syria, Iraq and Iran, indicate similar urban/rural differentials in infant mortality. On the other hand there do not seem to be marked differentials between urban/rural infant and child mortality in Sri Lanka although urban post neonatal mortality seems to be slightly higher than rural. The mortality rates of infants and children living on estates in Sri Lanka are much higher than in either urban and rural areas. One study indicates that maternal and child welfare services are much weaker in the estates than in the rest of the country. 11/

The urban/rural differential noted for many of these countries could be due to the class structure of the different populations, to environmental factors, or could reflect varying access to medical facilities. The data available do not permit the complete disentangling of the effects of the various factors but an example of the pattern of interaction found through such an analysis is seen in the urban/rural estimates of mortality by mother's education and father's economic status made in Indonesia in the late 1960s. The figures are based on a survey 12/ of estimates of mortality relating to children under

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8/ Levels and Trends in Mortality Since 1950, op. cit.

9/ Ibid.

10/ Ibid.

11/ S. A. Meegama, Socio-Economic Determinants of Infant and Child Mortality in Sri Lanka: An Analysis of Post-War Experience, World Fertility Survey document (forthcoming, 1980).

12/ Universitas Indonesia, Fakultas Ekonomi, Lembaga Demografi, Preliminary Report. Indonesian Fertility - Mortality Survey 1973, Jakarta, 1974.

age 5 during the 1965-67 period. With two exceptions the highest childhood mortality occurred in the lowest educational and economic categories while the lowest mortality was in the highest educational categories. Although in many instances the urban/rural differentials in Indonesia by educational level were small, mortality among children of rural mothers in the highest educational category was higher than in the corresponding category in urban areas, indicating the presence of other factors raising mortality levels in rural areas.

Few attempts have been made to analyse differential mortality by factors other than mother's educational level and socio-economic status. An analysis of mortality differentials in Sri Lanka 13/ based on data collected in the World Fertility Survey indicates that when controlled for other variables, the mother's level of education was not a significant factor affecting neonatal mortality. Rather, it was shown to be strongly influenced by age of mother, birth order, husband's educational level or occupation and environmental conditions. Neo-natal mortality ranged from 23 per 1000 live births among children whose mothers' age at time of birth of the child was between 20 to 34 years, where the husband had more than a primary education and the house had toilet facilities while it was 63 among mothers who were aged less than 20 or over 34 and where the husband had no education and the house had no toilet facilities. In the case of post neonatal mortality, the level of which is strongly influenced by environmental conditions, it was found that the availability of toilet facilities had a significant influence on the level of rural post neonatal mortality in Sri Lanka, while the influence of husband's level of education, taken as a surrogate for the economic level of the household, was very much less. The analysis also showed that mother's level of literacy when controlled by other variables had no influence on post neonatal mortality in the Sri Lanka context. The same survey however found that the three variables, husband's education, mother's literacy, and availability of toilet facilities all had a significant influence on the level of child mortality.

Estimates of differential neonatal and post neonatal mortality based on World Fertility Survey data are also available for Bangladesh, Indonesia and Jordan and they indicate differences in neonatal and post neonatal mortality by mother's education for the early 1970s although care should be taken in interpreting these estimates since they are based on small samples (see text table below).

13/ S. A. Meegama, op. cit.

Neo-natal and post-neo-natal mortality rates for three Asian countries with WFS data available

Country	Period	Mortality Rate
Bangladesh	1970-74	
Neo-natal		76.1
Post-neo-natal		59.0
Indonesia	1970-74	
Neo-natal		46.0
Bost-neo-natal		43.4
Jordan	1970-74	
Neo-natal		29.2
Post-neo-natal		38.2

Source: Eduardo E. Arriaga, Direct Estimates of Infant Mortality Differentials from Birth Histories. (World Fertility Survey Conference, London), 1980.

3. Latin America

The quality of statistics on differential mortality available for some of the Latin American countries is somewhat better than that are available for many African and Asian countries. They demonstrate that there are sharp mortality differentials among countries within the Latin American region. Life expectancy at birth varies from 69 years for both Argentina and Uruguay to 46 years in Haiti and 47 years in Bolivia. As in most developing regions there are great mortality variations within countries; furthermore mortality in the metropolitan city areas of Latin America is generally lower than in the rural areas. Even within Argentina, where mortality is quite low, there are still significant differentials in life expectancy between regions although less than in the past. In 1969-1971 expectation of life at birth in Buenos Aires was 66.2 years while it was only 59.5 years in Noroeste. Available figures for Chile, Peru, the Dominican Republic and Brazil also indicate the presence of such regional differentials. [14] A characteristic of mortality patterns in these countries is that the contrasts in mortality between regions are most marked during early childhood. The estimates of mortality for Peru, based on retrospective data given in Table 9.3 indicate large differences in infant and child mortality between regions with metropolitan Lima having the lowest level, but these wide differences in expectation of life at birth give way to homogeneity in expectations of life by age 15. In Argentina and Chile the expectation of life at age 15 based on registration statistics is more uniform among regions than is the expectation of life at earlier ages. [15]

Although aggregate metropolitan and urban mortality in Latin America is lower than that in rural areas there are significant mortality differentials within urban and rural areas. [16] An indication of the differentials in urban and rural mortality by mother's level of education is shown in Table 9.4. Very sharp differentials exist even in countries such as Costa Rica where inequality in the distribution of some of the factors that affect childhood mortality are believed to be lower than in most other Latin American countries. In urban Guatemala the probability of dying before age 2 varies from 25 per 1000 among children born to women with 10 or more years of education to 163 among women who have had no education. Cuba, on the other hand, has the lowest differentials in early childhood mortality by mother's level of education. The variation in mortality by education is small, the probability of dying before age 2 being 29 per 1000 among children with mothers who had 7 years of education and 46 among mothers with no education.

The estimates of mortality in Table 9.4 show that there are great variations in both urban and rural mortality by mother's education and that urban rural differentials for most countries tend to be smaller when controlled by education of mother. If health systems were less available and poorer in quality in rural areas, it would have been logical to expect rural mortality levels to be significantly higher than

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[14] Levels and Trends in Mortality Since 1950, op. cit.

[15] Ibid.

[16] H. Behm, et al. La Mortalidad en Los Primeros años de vida en Paises de la America Latina. CELADE (San José).

Table 9.3. Estimates of Several Mortality Parameters for Peru, 1974-1976.

Region	$_1q_0$	$_4q_1$	e_0	e_{15}
Costa	58.6	42.2	58.3	50.6
Resto Costa	74.9	17.4	57.1	50.6
Sierra	154.9	78.0	48.0	48.2
Selva	115.5	50.0	53.6	50.8
Lima Metropolitana	41.0	35.2	59.4	50.1

Sources: Direccion General de Censos y Encuestas Demográficas. *Encuesta Demográfica Nacional del Peru*. *Fasciculo No. 2*. (Lima, 1978).

Table 9.4. Probabilities of Dying Before Age 2 (x 1,000) by Rural-Urban Categories and Levels of Education in Selected Latin American Countries

	Mother's Educational Attainment (years of instruction)					
	None	1-3	4-6	7-9	10 or more	12 or more
Bolivia, 1975						
Total	245	209	176	110[a]		
Urban	212	205	166	100[a]		
Rural	255	208	181	144[a]		
Ratio Rural/Urban	1.20	1.01	1.09	1.44		
Chile, 1970						
Total	131	108	92	66	46	
Urban	125	104	89	65	47	
Rural	136	113	105	79	--b	
Ratio Rural/Urban	1.09	1.09	1.18	1.22		
Colombia, 1973						
Total	126	95	63[c]	42[d]	32[e]	31
Urban	122	86	57[c]	42[d]	30[e]	29
Rural	129	104	85[c]	46[d]	65[e]	--b
Ratio Rural/Urban	1.06	1.21	1.49	1.10	2.17	
Costa Rica, 1973						
Total	125	93	70	51	33	
Urban	92	83	58	54	32	
Rural	123	96	79	40	37	
Ratio Rural/Urban	1.34	1.16	1.36	.74	1.16	
Dominican Republic, 1975						
Total	163	131	108	83	55	
Urban	171	135	104	82	49	
Rural	159	130	112	83	--b	
Ratio Rural/Urban	.93	.76	1.08	1.01		
Ecuador, 1974						
Total	176	134	101	61	46	
Urban	173	125	89	58	44	
Rural	176	138	113	75	61	
Ratio Rural/Urban	1.02	1.10	1.27	1.20	1.39	
El Salvador, 1971						
Total	158	142	111	58	30	
Urban[f]	184	136	98	37[a]		
Rural[g]	156	144	118	60		
Ratio Rural/Urban	.85	1.06	1.29	1.62		
Guatemala, 1973						
Total	169	125	85	58	26	
Urban	163	113	77	60	25	
Rural	170	132	105	39[a]		
Ratio Rural/Urban	1.04	1.17	1.36	.65		
Honduras, 1971						
Total	171	129	99	60	35	
Urban	167	121	84	50	33[b]	
Rural	171	132	114	85	--	
Ratio Rural/Urban	1.02	1.09	1.36	1.36		

Table 9.4 (continued)

	Mother's Educational Attainment (years of instruction)					
	None	1-3	4-6	7-9	10 or more	12 or more
Nicaragua, 1971						
Total	168	142	115	73	48	
Urban	185	145	114	69	50	
Rural	163	138	120	--b/	--b/	
Ratio Rural/Urban	.88	.95	1.05			
Paraguay, 1972						
Total	104	80	61	45	77	
Urban	106	89	58	45	24	
Rural	103	78	62	41	--b/	
Ratio Rural/Urban	.97	.88	1.07	.95		
Peru, 1972						
Total		207h/	36i/	102j/	77k/	70l/
Urban		176h/	127i/	99j/	76k/	69l/
Rural		223h/	156i/	120j/	97k/	101l/
		1.27	1.23	1.21	1.28	1.46
Cuba*	46	45	34	29		

Source: H. Behm, et al. La Mortalidad en Los Primeros años de vida en Paises de la America Latina. CELADE (San José). For Cuba, see Jacques Vallin and Hugo Behm, Mortality Differentials Among Human Groups, IUSSP Seminar on Biological and Social Aspects of Mortality and the Length of Life (Fiuggi Terme, Italy, May 1980).

* Provisional.

a/ Seven or more years of instruction.

b/ Not calculated because the women in the group had fewer than 100 children.

c/ 4-5 years of instruction.

d/ 6-8 years of instruction.

e/ 9-11 years of instruction.

f/ Urban El Salvador.

g/ Remainder of El Salvador.

h/ Less than 3 years of instruction.

i/ Did not complete primary education.

j/ Primary level completed.

k/ Secondary education not completed.

l/ Secondary or higher education completed.

urban levels even when controlled by mother's education. It would thus seem that for the less well educated in Latin American communities, environmental sanitation and access to medical services are lower whether they live in urban or rural areas.

Little information is available regarding the differentials in cause of death among social classes in Latin America. One investigation of post-neo-natal mortality in Chile shows that much of the difference between children of blue collar workers and white collar workers is due to diarrheal and respiratory diseases or due to conditions induced by malnutrition (Table 9.5).

B. Developed countries

It has generally been assumed that mortality differentials by social class in the developed countries would gradually lessen as available health technology and health care systems as well as compulsory health insurance schemes were expanded to larger segments of the population. The improvements in sanitation, the availability of protected water supplies, the general improvement in the clothing of the mass of the people, and the reduction in malnutrition - key factors to which large-scale reductions in mortality have conventionally been ascribed - were all expected to contribute to a lessening of mortality differentials by social class.

The results of these efforts can be judged by examining the course of mortality levels in the developed countries during the last few decades. Unfortunately, long term statistics on mortality differentials are available only for England and Wales, where death rates by occupation have been calculated since 1921.

1. Early age mortality

Table 9.6 shows the trend in infant mortality for the 50 years period 1921-1971 by occupation. Mortality has declined sharply among all groups between 1921 and 1971 but there has been no narrowing of the gap between social groups. Infant mortality among unskilled households is, as it was 50 years ago, approximately 2-1/2 times that among professional households. Similar results appear for France and the United States of America. An INSEE Study [17] done in France for the

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[17] S. Hemery and M. C. Gerard, "La mortalité infantil en France selon le milieu social", in Congres international de la Population, Liège, 1973 (Liège, 1973), pp. 171-184.

Table 9.5. Post-Neonatal Mortality: Causes of Death According to Father's Occupational Group. Chile 1972-1973

Group of causes of death	Rates per 100,000 births: Children of White collar workers (1)	Rates per 100,000 births: Children of Blue collar workers (2)	Rates per 100,000 births: Ratio (2)/(1)
Reducible mortality	937	3,243	3.5
Infectious ethiology	385	1,233	3.2
Respiratory diseases	462	1,683	3.6
Malnutrition	41	227	5.6
Accidents	49	100	2.0
Non-avoidable mortality	120	124	1.0
Ill-defined causes	136	589	4.3
Other causes	71	128	1.8
Total	1,263	4,083	3.2

Source: Taucher, E., Mortalidad infantil en Chile: tendencias, diferenciales y causas. CELADE. octubre, 1978.

Table 9.6 England and Wales: Infant Mortality Pates by "Social Class"

Year	"Social class"							Mortality rate index for un-skilled where the rate for professional equals 1.00
	Professional	Managerial and lower professional	Skilled		Partly Skilled	Un-skilled	Total	
			Skilled non-manual	Skilled manual				
1921	38.4	55.5	76.8		89.4	97.0	79.1	2.53
1930-32	32.7	45.0	57.6		66.8	77.1	61.6	2.36
1949-53	18.7	21.6	28.6		33.8	40.8	29.5	2.18
1970-71	11.6	13.6	14.5	16.9	19.5	30.7	17.6	2.65

Sources: United Kingdom, The Registrar General, Occupation Mortality, Part II, Vol. I: Commentary, (London, 1958); United Kingdom, Office of Population Censuses and Surveys, Occupational Mortality 1970-72, Series DS, No. 1 (London, HMSO, 1978).

period 1950-1970 shows that the gap between the extreme ends of the occupational hierarchy are approximately of the same order as in England and Wales. Infant mortality among professional and senior managerial staff in 1966/70 was 12.2 per 1000 births while unskilled workers had an infant mortality rate of 30.4. Available figures 18/ on infant mortality differentials in the United States show a ratio of 2.2 for the period 1964-66 between the highest and lowest groups as classified by income and mother's education; the mortality rate was 37.3 where the household income was below US $3000 and the mother had less than 9 years of schooling while the rate was 16.7 where the household income was above US $5000 and the mother had at least 13 years of education.

A W.H.O. sponsored survey 19/ of social and biological effects on perinatal mortality in England and Wales, Austria and New Zealand also shows a clear social class gradient by father's occupation.

The INSEE Study in France which is based on a linkage of birth certificates and death certificates for a sample of births commencing from 1950 also permits an analysis of mortality by age of infant according to social class. The ratio of neo-natal mortality among unskilled workers to that of professionals remained stable at around 2 during the period 1956 to 1970 while the ratio of post neo-natal mortality between the two occupational groups seems to have shown a significant downward shift. Considering that post neo-natal mortality is almost entirely due to preventable causes, the decline in post neo-natal mortality as well as the narrowing of the gap between the two groups indicate a greater equality between classes of those social factors which affect health and mortality. This reduction in the ratio of post neo-natal mortality between classes is also seen in the figures for Scotland 20/ for the period 1939-1976. While the ratio

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18/ National Center for Health Statistics, Infant mortality rates: Socio-economic factors, Vital and Health Statistics, Series 22, No. 14, Rockville, 1972.

19/ Report on an International Comparative Study sponsored by the World Health Organization: Social and Biological Effects on Perinatal Mortality, (Budapest, 1978), vol. 1, chapter 8.

20/ Scotland, Registrar General, Annual Report, 1976, Part 1 - Mortality Statistics (Edinburgh, HMSO, 1977).

for neo-natal mortality between the unskilled and professionals has remained around 1.5 to 2 the ratio for post neo-natal mortality has declined from around 6 to 3.5 in the period 1939-1976.

The effect of social factors on post neo-natal mortality in the United States is seen in a study 21/ done by the Citizen's Board of Inquiry into Hunger and Malnutrition in the United States. Comparing post neo-natal mortality of countries with highest and lowest percent of poor families it found that "In virtually every state the post neo-natal rate in the poorest county dramatically exceeds the post neo-natal rate for the wealthiest county".

Significant geographic differentials were also found in Great Britain. In the perinatal mortality survey 22/ of Britain conducted in 1958 the investigators found that perinatal mortality was highest in the North and North West of England, Wales and Scotland. These areas were characterized by dependence on heavy industry and mining, a high proportion of people living in sub-standard housing, poor nutrition, and a high proportion of poor families. The perinatal mortality rate was lowest for the Southern zone dominated by London and the South East. This was the most prosperous part of Britain with the best nourished people and the smallest proportion of poor families. It might be added that these differentials between the regions prevailed also for infant mortality and for mortality among adult males. 23/

There is little information on socio-economic differentials in child mortality for the age groups, 1-4, 5-9, 10-14 in the developed countries except for the information in the decennial supplement on England and Wales based on the 1971 census. 24/ They indicate that

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21/ Citizen's Board of Inquiry into Hunger and Malnutrition in the United States, Hunger, U.S.A., p. 34, Boston 1968.

22/ D. Baird, "Perinatal Mortality", Lancet, 1, 54, 1969.

23/ A. J. Fox, "Prospects for Measuring Changes in Differential Mortality" in Proceedings of the Meeting on Socioeconomic Determinants and Consequences of Mortality, Mexico City,(Geneva, 1979), Table 18.

24/ United Kingdom, Office of Population Censuses and Surveys, Occupational Mortality, 1970-72, The Registrar General's Decennial Supplement for England and Wales 1970-72. Series DC, No. 1 (London, HMSO, 1978).

among males mortality in the professional social class is approximately half that in the unskilled class although the differential is a little less for girls.

2. Adult mortality

Statistics on adult mortality available for every developed country indicates that adult males in non-manual occupations experience lower mortality than those in manual occupations. [25] The differential is highest among the younger age groups and with increasing age there is a steady narrowing of the gap.

Data on adult mortality by social class available for England and Wales for the period 1921-1971 indicate the presence of differentials at each census by social class although the magnitude of the difference is less than that for infants and children. However due to changes in classification and the composition of social groups it is not possible to state with certainty whether these differentials have decreased or increased over the period. [26] In France a longitudinal survey based on a sample of French adult males aged between 30 - 69 in 1954 has been carried out by INSEE by linking death certificates to census returns. [27] Mortality differentials by occupational groups for the period 1955-71 as presented in Table 9.7 indicate no reduction in such differentials over time and a surprisingly high differential for the age group 40-55 where mortality of unskilled workers is approximately 3 times that of professional groups. In England and Wales in 1970-72 there was a gap of over 5 years in the expectation of life at age 15 between own account farmers (58.6) and labourers (53.3).

In the United States social class differentials are reflected in the statistics on mortality rates by colour. In 1977 the average expectation of life of a white person was 73.8 years in contrast to 68.8 years for all other persons. [28]

Any attempt to work towards reducing social differentials in mortality has to be based on an understanding of the incidence and impact of various diseases on different social classes. Data on France, England and Wales, Japan, Australia and New Zealand indicate that there is a social class differential in deaths from malignant neoplasms, with

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[25] Levels and Trends in Mortality Since 1950, op. cit.

[26] See A. J. Fox, op. cit., p. 9-10, for comment on problems involved in making such a comparison.

[27] J. Vallin, "Socioeconomic Determinants of Mortality in Industrialized Countries", in Proceedings of the Meeting on Socioeconomic Determinants and Consequences of Mortality, Mexico City, (Geneva, 1979).

[28] U. S. Department of Health, Education, and Welfare, National Center for Health Statistics, Vital Statistics of the United States, 1977: Life Tables, vol. II, sec. 5 (Hyattsville, 1980), Table 5.3, pp. 5-13.

Table 9.7. France: Recent Trend in Probability of Death of Males between 40 and 55 Years and between 55 and 70 Years, by "Social Group" (French males born in France only)

	Probability of death					
	Between 40 and 55 years			Between 55 and 70 years		
Social group	1955-60	1961-65	1966-71	1955-60	1961-65	1966-71
1. Teachers, senior management and professions	6.1	5.6	5.1	24.5	24.0	23.9
2. Lower management, technicians, Catholic clergy	7.5	7.2	7.2	28.0	29.3	27.1
3. Farmers, craftsmen and tradesmen, foremen, skilled workers in the public sector, and office workers	9.6	9.2	9.3	32.1	32.8	30.5
4. Skilled workers in the private sector, semi-skilled workers, and farm workers	12.2	12.3	11.6	37.2	38.8	38.5
5. Unskilled workers	16.8	16.2	16.7	43.0	43.1	45.0
France as a whole	11.7	10.9	11.8	35.6	35.4	35.0
Ratio of rate for unskilled workers to the rate for teachers, senior management and professions	2.75	2.89	3.27	1.75	1.80	1.88

Source: J. Vallin, op. cit.

manual workers exposed to higher risks than in other occupations. Suicide and accidents also show strong social class differentials. [29]

Some aspects of these differentials are seen in the data for France. Statistics on social class differentials in mortality by disease are available for France in the INSEE study on adult mortality [30] Table 9.8 on the mortality of males aged 45-54 years shows a marked disparity in the mortality of unskilled workers and professionals by cause of death. Although the death rate from cardio-vascular diseases is not very different for the two groups, the probability of death from cancer among unskilled workers is more than twice that among professionals. Perhaps most notable is the inequality in the proportion of deaths due to causes such as alcoholism, accidents and suicide which have traditionally been ascribed to social causes. The death rate due to alcoholism and cirrhosis of the liver among unskilled workers is more than 10 times that among professionals. It might also be noted that over 40 percent of the deaths of male unskilled workers aged 45-54 years is due to accidents, suicide, alcoholism and cirrhosis of the liver while the corresponding figure for professionals is only a little over 20 percent.

Similar factors appear to be responsible for differentials in death among younger and older adults in France. Among younger adults differentials are primarily due to the classical social causes such as alcoholisms, accidents and suicide which accounts for 62 percent of the excess death rate. Among the older adults, although these factors account for 45 percent of the excess, cancer accounts for an additional 27 percent.

Conclusions

The previous pages have highlighted available information on differential mortality within both the developing and developed regions. The purpose of the report was simply to provide a comparative description of these data. However even fulfilling this limited goal proved to be only partially successful. The reasons were not only the paucity of data but also measurement problems, differences in socio-economic

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[29] Levels and Trends in Mortality Since 1950, op. cit.

[30] J. Vallin, op. cit.

Table 9.8. France: Annual Probability of Death for Males by Age Group and Cause of Death in 1966-1971, for Senior Managers and Unskilled Workers (per 100,000)

Age group	Cause of death								
	Cardio-vascular diseases	Cancer	Suicides	Transport accidents	Other accidents	Tuberculosis	Alcoholism and cirrhosis of the liver	Other causes and undetermined causes	Total for all causes
45-54 years									
Unskilled workers (1)	183.6	291.9	93.7	117.1	186.1	36.7	227.2	319.3	1455.6
Senior management (2) and professions	132.3	127.1	18.7	36.7	33.3	3.9	20.8	106.8	479.6
Ratio (1)/(2)	1.39	2.30	5.01	3.29	5.59	9.41	10.90	2.99	3.03

Source: J. Vallin, *op. cit.*

and geographical variables used for classifications and variations in definitions and interpretations of the data.

Nevertheless the available information often pointed clearly to large differentials in mortality both among and within countries of the developing and developed world. Research studies in developing countries have established differentials in early childhood mortality by educational level of the mother, but little attempt has been made to study and understand how maternal education influences the complex of factors determining the level of infant and child mortality. Differentials in the use of antenatal and postnatal health services, adoption of hygienic practices, length of breast-feeding, age at weaning, use of trained midwives or hospitals for deliveries of babies may very well explain educational differentials in early childhood mortality. But these factors are not well measured and reasons for possible differential adoption are not well understood. Data on differential mortality among ages above childhood in the developing world are nearly non-existent but differentials apparently appear to exist among adults also although evidence from Peru indicates that they may not be of as large as among children.

Within the developed region many countries provide evidence as measured by various variables, of social class differentials in mortality, of large and at times unchanging dimension. However few countries have tabulated the necessary data by cause of death, limiting the opportunities to systematically investigate and understand the reasons for such differentials.

Chapter 10

HEALTH, POPULATION AND DEVELOPMENT [1]*

The perception of development, as a goal for human communities, has gradually widened its focus during the 1970s. The purely economic perception as typically expressed in terms of per capita gross national product is increasingly seen as a grossly inadequate measure of man's aspirations and achievements. In the first place, information about the national aggregate or per capita product reveals nothing about the distribution of this product among the various groups of the population. Even more fundamental, however, is the increasing recognition that the degree of production and consumption of goods and services is only one aspect of quality of life and it should not be considered to the exclusion of all other aspects in the debate on what kind of future man should be working towards. Such goals include the promotion of human dignity and welfare and the radical elimination of poverty as the greatest obstacle to national and international progress and peace. Many forces have been at work to bring about this change of perception of the nature of socio-economic development, but one of the most important has undoubtedly been the increasing importance assigned to health.

Health is not only a desirable goal in itself; it is also increasingly being recognized as a means and, indeed, an indispensable component, if not pre-requisite, of social and economic development. The many vital links between health and development are thus seen as interacting phenomena with far-reaching implications. One such implication is the realization that the provision of health services is only one of many contributions to health development, that the improvement of the health status of populations requires a wide range of mutually supportive policy measures and cannot be restricted to health policy in the more narrow traditional sense. The attainment of health targets is dependent on appropriately defined progress on the economic front, on social policy measures aimed at greater equity, on improvements in the physical and sanitary environment, on the availability of adequate food supply, on implementation of appropriate population policies, and also on political and institutional changes enlisting the active co-operation of the public. Hence the new emphasis on health development as an integral component of national and international development strategies.

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[1] This section draws heavily on material from the "Sixth Report on the World Health Situation, 1973-77", WHO, 1980.

* Prepared by the World Health Organization.

But the situation remains less happy than might have been expected a decade ago. About 800 million people in the developing world live in conditions of abject deprivation, with incomes too low to ensure basic nutrition and with little access to essential health services. At least 450 million people have less food than is necessary for healthy functioning and survival; even more lead a precarious existence on the brink of hunger. Perhaps less than one-third of the people in developing countries have safe water and adequate sewage disposal. Housing conditions and educational opportunities are unsatisfactory in many urban areas. The number of illiterate adults is increasing. About 300 million adults are unemployed. As regards morbidity, there has been a significant increase or resurgence of certain communicable diseases, schistosomiasis being an example of an increase and malaria of a resurgence. Little progress can be reported with regard to tuberculosis or sexually transmitted diseases, though the conquest of smallpox appears to have been completed during the period under review. Cardiovascular disease and cancer continue to be the greatest disease problems of the industrialized countries, with many middle-income countries moving into the same situation. Most of these data are approximations because there is a lack of basic information from a large part of the world, but they do suffice to paint a realistic picture of the enormous problems that have to be overcome if there is to be a breakthrough in efforts to improve the health status of the world's population.

At the same time, the cost explosion in health care in a number of industrialized countries has been partly responsible for a re-examination of the relationships between the growing volume of expensive health care - particularly hospital in-patient care - and improved health indices. There is a growing consensus that additional expenditure on health care, at least in the developed countries, is not bringing about a commensurate improvement in health. Furthermore, a pattern of spending which is heavily biased towards technically sophisticated in-patient care is now seen as inappropriate, even in wealthy countries. In low-income countries the issue is still more clear-cut.

In the search for alternative approaches, that of primary health care emerged as the most important means whereby the health sector can improve the health status of the population and thus make an effective contribution to overall socio-economic progress. These principles were eventually incorporated in the more comprehensive statement on primary health care to be found in the Declaration of Alma-Ata prepared in September 1978 at the International Conference on Primary Health Care. In many ways this Conference represented the culmination of the search initiated in 1973 for an "alternative approach" to the basic health services. It also laid the foundation for initiating a social revolution in community health, with the explicit intent of achieving the goal of "the attainment by all peoples of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life". The practical application of these principles of primary health care differs significantly between countries and considerable variations can be observed in the speed with which national primary health care programmes are being implemented. Nevertheless, common principles are pursued, particularly the requirements of active community participation, support to family self-care, intersectoral approaches as part of overall development plans, and the maximum use of local, human and other resources, the use of appropriate technologies, and priority for prevention and health promotive elements, such as education concerning prevailing health problems, nutrition, maternal and child health care, family planning, an adequate supply of water and basic sanitation; immunization, among others.

In order to be able to monitor the progress towards the global goal of "health for all", considerable emphasis is now being placed on the evaluation of the development process in general and social progress, including health improvements in particular. Ways of measuring the impact of health action on the improvement of health status are being given increasing priority, along with indicators for health care generated from information for managerial use at all levels of the health care system. An example of such an indicator is the proportion of low birth weight babies (i.e., those weighing less than 2.500 g). Because low birth weight is the single most important determinant of the chances for healthy survival and development of the newborn, and because the frequency of low birth weight is closely associated with adverse environmental conditions, this indicator reflects one very important linkage between socio-economic conditions and health. However, health-related socio-economic data cover a wide spectrum of information, most of which is collected outside the health sector and often without any co-ordination with the health administration. Their usefulness for the health sector may therefore be limited and many areas of presumed interaction with health remain largely undocumented and unquantified.

Among all the interactions between health and development, some of the most important ones are those where population growth and change are intermediate variables. For example, the age/sex distribution of a population is largely the result of trends in fertility and mortality in the past; both of these trends - and especially the latter - having been strongly influenced by the health status of the population and the changes occurring in this status. Conversely, the present age/sex distribution is a strong determinant of the actual health status and health care needs of the population because the disease spectrum and the consequent needs for care vary so much with sex and age. Hence, the European countries which have experienced low and decreasing rates of fertility and mortality for several decades now have increasingly top-heavy population pyramids, with rapidly growing age groups above 65 years and, particularly, above 80 years, most of whom are women. Combined with the almost total disappearance of infectious diseases once common in childhood, and with the increase of age-specific incidence of some non-communicable diseases, such as cancer and cardiovascular disease, the changing age/sex distribution has brought about very radical changes in the amount and nature of the demand/need for health care. Similar changes are already beginning to be felt in many developing countries and projections indicate that they will accelerate in the years to come.

The trends in fertility and mortality are the main determinants of population growth, a demographic variable of key importance for economic growth and social development. In a substantial number of developing countries, rapid population growth is seen as a matter of serious concern and programmes to reduce the rate of growth receive a high priority. Family planning is one of the important operational elements of such programmes, usually under the responsibility of the health authorities, who in most countries actively promote family planning as a health measure. It is now generally recognized that family planning can favourably influence the health, development, and well-being of the family, particularly mothers and children through (1) avoidance of unwanted pregnancies and the occurrence of wanted births that might otherwise not have taken place; (2) a change in the total number of children born to a mother; (3) achievement of an optimal interval between pregnancies; and (4) changes in the time at which births occur, particularly the first and the last, in relation to the ages of the parents and especially that of the mother. In addition to the positive health effects of family planning, the ability of women to control their own fertility has opened a new set of options for women, and is seen as an essential pre-requisite to their achieving full equitable participation in social and economic development.

In the 1970s there has been a steady improvement in fertility control methods and their application. New types of intrauterine device, various steroidal preparations, new approaches to female sterilization, and easier, safer methods of pregnancy termination are now an important part of maternal and child health and family planning services, and appropriate training programmes are necessary.

In rural areas, new approaches are being tested in order to extend coverage and improve the quality of maternal and child health and family planning programmes. Some of these are large-scale programmes, others are local adaptations. The common aim is to have maternal and child health and family planning care available to virtually every household. Finding a way to do this will be a major concern of health authorities over the next 10-20 years.

According to a recent worldwide survey, the percentage of sexually active women of reproductive age practising family planning nearly doubled in some regions during the first half of the 1970s, and it was estimated that, in 1976, 34 per cent of sexually active couples of reproductive age throughout the world 2/ were using some form of contraceptive method regularly. A comparison of rates of use of contraceptive methods by persons attending health care services in 1971 and 1976 indicates a significant increase over the five-year period. Among couples practising family planning, the percentage of those using oral contraceptives or intrauterine devices and of persons undergoing sterilization increased. However, there are wide differences within and between countries; for example, an estimated 53 per cent of sexually active women of reproductive age practised family planning in the Western Pacific Region, whereas in West Africa the figure was only 3 per cent. A series of fertility surveys in all parts of the world showed a large proportion of women who wanted no more children, yet did not practise contraception. Inadequate contraceptive information and services were seen as among the main reasons for failure to meet the national population growth reduction targets set by some countries with high fertility levels and large populations.

Some of the most important new health programmes are to be found in the area of family health. This is a particularly significant area because it is in the context of the family that the health needs of its members can

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2/ The survey did not include China and the USSR.

be met most effectively and in ways which are easily acceptable. A sharp decrease in the early childhood mortality rates, which are at present very high, is considered an essential prerequisite for lowering fertility rates in those areas of the world where this is considered a priority or medium-term goal. About 17 million children under 5 years of age died in 1978. If all the countries of the world have had the same early childhood mortality rates as those of Northern Europe, there would have been only 2 million such deaths. Viewed in the light of global resources and knowledge, this reflects the lack of a worldwide commitment to closing the health gap between countries. Stark inequalities in health are also often found between population groups within a country as exemplified by the data in Table 10.1 below, showing the levels and ratios of post-neonatal mortality among children of white-collar workers and blue-collar workers, respectively, in Chile in 1972-73. The latter group had, on the aggregate, three times as high mortality as the former.

Table 10.1 Post-neonatal mortality : Causes of death according to father's occupational group, Chile, 1972-1973.

Group of causes of death	Mortality per 100,000 births among children of		
	White-collar workers (1)	Blue-collar workers (2)	Ratio (1)/(2)
Reducible mortality	937	3243	3.5
Infectious etiology	385	1233	3.2
Respiratory diseases	462	1683	3.6
Malnutrition	41	227	5.6
Accidents	49	100	2.0
Non-avoidable mortality	120	124	1.0
Ill-defined causes	136	589	4.3
Other causes	71	128	1.8
Total	1263	4083	3.2

Source: TAUCHER, F. Mortalidad infantil en Chile, tendencies, In the 1970s, changing patterns of social and economic development and the possibility of planning the timing and spacing of children have had an important impact on family structures and functioning. The changes influence women's and men's economic and social roles as well as the patterns of child-bearing and child-rearing and hence the health of the family. The changes in traditional family structures in some areas have left many women without adequate alternative support mechanisms - a situation that has implications for women's health as well as the health of the family as a whole. In this connexion should be mentioned the worldwide trend away from breast-feeding with its serious consequences on infant health.

In general, the priority health problem of mothers and children and high levels of mortality and morbidity derive to a large extent from the synergistic effects of malnutrition, infection, and uncontrolled fertility, which are themselves consequences of poor environmental and socio-economic conditions, including the unavailability of health care. It has become increasingly clear that activities and programmes in all developmental sectors, not only the health sector, are essential to improve health, particularly that of mothers and children. Within the health sector, experience in different countries has shown that activities and programmes in family, maternal and child health are more successful when they are closely linked with other essential tasks, such as education on prevailing health problems, nutrition programmes, and communicable disease control activities, including immunization, and when a multi-disciplinary integrated approach, ensuring the effective participation of individuals, families and communities, is adopted.

Outlook

The latter part of the 1970s has not been altogether favourable for world health, and various studies of prospective economic trends undertaken by the United Nations system draw attention to the economic constraints under which the health sector may have to operate in the next decades. At the same time, it will be necessary for developing countries to profit from the experience of the developed countries so as to avoid certain undesirable aspects of development such as air, water, and soil pollution, and energy problems, with which a number of countries are currently struggling.

Nevertheless, in the coming decades a number of factors will combine to increase health care costs. They include growing health consciousness, producing an increased demand for high quality treatment services; extension of coverage of health care programmes so as to remove all physical and financial barriers to its ready access and utilization; introduction of environmental control measures to eliminate or at least reduce potential health hazards; progress in biomedical research and health technology.

Numerical projections of changes in health status have up to now largely been limited to projections of mortality. It can be argued that such mortality projections, which are mainly demographic in nature, are only of limited usefulness for health planners, particularly in countries with already relatively low mortality levels. Nevertheless, life expectancy at birth despite its limitations, has often proved extremely useful as a single measure of the level of health of a population, particularly when viewed from the broader perspective of socio-economic development strategy. In developing countries it may be anticipated, barring unforeseen developments, that by the year 2000 the majority of their populations will have a mean life expectancy at birth of at least 65 years, and the infant mortality will only rarely be in excess of 50 per 1000 live-born. Thus the present gap in life expectancy at birth between developed and developing countries, which is estimated to be of the order of 15-18 years, will be almost halved by the end of this century, provided that satisfactory progress is made in those social, economic, and politico-institutional areas that influence mortality. It should be borne in mind, however, that today the gap in life expectancy at birth between the group of the least developed countries and the remainder of the developing countries is of a magnitude of about 10 years. The least developed countries, will, therefore, have to achieve much greater gains if current inequalities are to be drastically reduced.

Chapter 11 *

CAUSES AND CONSEQUENCES OF INTERNAL MIGRATION IN DEVELOPING COUNTRIES

The economic development of today's industrialised countries in most cases involved a continuous transfer of economic activity from agriculture to industry and services and people from rural to urban areas. As industries expanded new urban employment opportunities were created, while technological progress in agriculture reduced the demand for labour in rural areas. As a result, rural-urban migration is regarded as having been an unavoidable and indeed a necessary element of past economic development. However, the current shift in population distribution in developing countries is unprecedented in its speed. In the view of many, this massive rural-to-urban population movement has been the major cause of growing levels of unemployment and underemployment in the cities. Since urbanisation has been proceeding much faster than industrialisation, it is widely argued that the flow of migrants to the city should be slowed down.

However, policies to slow migration cannot be formulated in the abstract. Governments considering programmes and implementing policies which influence population redistribution must first examine the causes and consequences of migration. They must also examine why economic development sets in motion a complex of forces that lead to the movement of both capital and labour towards favoured locations and concentration of social and economic activities in cities, particularly large ones. This examination should facilitate the formulation of appropriate policies to deal with the causes and consequences of internal migration in socially desirable ways.

A. Basic causes of rural-urban migration.[1]

Much has been written on the determinants of migration. The most popular explanation among economists is the expected income model which in its simplest form postulates that an individual or family would migrate if the expected income from moving was greater than the sum of the expected income from staying and the costs of moving. The overwhelming conclusion of most migration studies using this approach is that people migrate primarily for economic reasons. [2] The greater the difference in economic opportunities between urban and rural regions, the greater the flow of migrants from rural to urban areas.

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[1] This section is largely based on A.S. Oberai: "An overview of state policies and internal migration in Asia", Population and Labour Policies Programme Working Paper No. 88 (Geneva, ILO, June 1980).

[2] For a review of studies using this approach, see M.P. Todaro: Internal Migration and Economic Development (Geneva, ILO, 1976).

However, the difficulties with this approach are twofold: first, it gives little attention to the role of non-economic factors in the mobility decision; and second, it abstracts from the structural aspects of the economy. A better understanding of the causes of migration requires an analysis of those macro-economic factors which generate rural-urban differentials within a framework of structural change where a given mode of production is substituted for another as a result of specific economic processes.

In most developing countries, low agricultural incomes and agricultural unemployment and underemployment are major factors pushing migrants toward areas with greater job opportunities. A recent study of several countries in Asia has noted increasing unemployment and declining rural income of the rural poor. 3/ Population pressure, resulting in a high man/land ratio has been widely hypothesised to be among the important causes of poverty and rural out-migration. With a given mode of production, there is a certain labour force which can be productively employed in agriculture. Unless the non-agricultural sectors in the rural areas can take up the surplus, these people must move to the cities to be gainfully employed.

But rapid population growth is certainly not the only cause of increasing rural unemployment and poverty. Equally important causes are the low rate of investment in agriculture, fragmentation of land ownership, inequalities in the distribution of land and other productive assets, allocative mechanisms which discriminate in favour of the owners of wealth, and a pattern of investment and technical change which is biased against labour. 4/

Most countries in Africa, Asia and Latin America are characterised by highly unequal distributions of land ownership. Although some type of land reform has taken place in many countries, progress towards redistribution has not yet resulted in a sizeable reduction in inequality in land ownership except in a few countries. Unequal distribution of land may encourage large-sized operational farming with adverse consequences for manpower absorption and the distribution of rural income.

The structure of the capital and labour markets in many countries is also such that an unequal distribution of income arising from an unequal distribution of productive assets is reinforced by the operations of the price mechanism. Those who have access to the organised capital market are able to

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3/ A.R. Khan *et al*: Poverty and Landlessness in Rural Asia (Geneva, ILO, 1976).

4/ See, for example, Guy Standing and Fred Sukdeo: "Labour migration and development in Guyana", International Labour Review, Vol. 116, No. 3, November-obtain financial capital for investment on relatively favourable terms. This introduces a strong bias in favour of investment in the capital-intensive methods of production and commercialisation in agriculture. Technical assistance is concentrated on the large farmers and research programmes are often oriented toward their needs. Even the labour market operated to the advantage of the rich, monopsonistic elements being often associated with a high degree of concentration of land ownership.

As a result, large landowners get richer, while small farmers who cannot afford to adopt the new technology are left behind. Because the increased productivity of large farmers agricultural prices fall and the incomes of small farmers drop. Many small farmers are then forced to sell their land to the large landowners and compete with wage labour for work.

Thus an unequal pattern of land ownership has resulted in increased landlessness and near-landlessness. As the pool of landless and near-landless enlarges, new forms of serfdom may emerge based on debt. 5/ The increasing commercialisation also affects the landless through changes in the modes of wage payment, and, in particular, the increase of monetary rather than share payments. This change speeds the breakdown of traditional village social and economic relationships and many of the landless decide to migrate to the more prosperous rural areas while others abandon the countryside and move to the city in search of non-agricultural jobs which are viewed as offering higher pay, more benefits and greater opportunities for occupational mobility. They have little incentive to continue working in agriculture where employment conditions are far from satisfactory and the majority are casual workers not having any permanency of status.

While the forces listed above have led to rural-rural or rural-urban migration among the very poor, promotion of schools in rural areas has done much to stimulate out-migration by rural youth, who have received primary or secondary education. Some of them migrate to improve their education and skills while others become dissatisfied with the prospect of rural life.

A few studies tend to support the hypothesis that migrants are attracted to cities in search of better entertainment or "bright city lights". 6/ Educational opportunities, medical services, cultural and entertainment activities, and many other facilities are not present in the villages or are available on

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5/ For details, see Peter Peek and Guy Standing: "Rural-urban migration and government policies in low-income countries", International Labour Review, Vol. 118, No. 6, November-December 1979.

a very modest scale. A number of other factors, such as the presence of friends and relatives in urban areas who often provide initial help and financial security and the desire of migrants to break away from the traditional constraints of inhibiting rural social structures have also been cited as likely determinants of migration.

National policies also exercise a powerful influence on redistributing population among different regions and between rural and urban areas. Among them are industrial location and foreign trade policies, credit allocation, public investment and subsidy or pricing policies giving preferential treatment to economic activities which are concentrated in a few cities and regions. The implicit anti-agricultural bias in most import substitution policies tends to encourage concentration of industries in large metropolitan areas. Of major significance, however, is the place accorded to rural development and the farm sector in the national growth strategy. In many developing countries if the agricultural sector is supported at all, it is often with the objective of getting maximum growth in agricultural output with a given amount of capital investment. Such a strategy generally favours medium or large land holding farmers. Moreover, investment in agriculture may lead to increasing inequalities and reinforce the political and economic dominance of those farmers who can adopt practices that reduce the employment generating potential of agricultural growth.

Until recently, governments have also placed the majority of public and social service investment in urban areas, particularly major urban areas. 7/ Similar investments have been neglected in the rural areas. At times, governments have also engaged in deficit spending in order to provide jobs for the urban unemployed. This had had an inflationary impact on prices and wages in the urban areas. The minimum urban wage for unskilled labour has tended to rise much faster than the minimum or current agricultural wage, partly because the urban wage earners have often succeeded in pressuring companies or the government into raising their wages. As a result the income differential between urban and rural unskilled workers has been increasing and has encouraged further migration.

Many developing countries also provide their young people with an education which reinforces urban cultural values so that the rural youths after having gone through the educational system refuse to stay in rural areas.

7/ See for example, Pamela Brigg: "Some economic interpretations of case studies of urban migration in developing countries", IBRD Staff Working

B. Consequences of internal migration

To analyse the economic and social effects of migration it will be necessary to separate the overall effects on rural and urban areas from the micro level effects at the individual household level and to distinguish between different effects on different groups or classes in the rural and urban areas.

Consequences for migrants themselves

Until a few years ago, much of the literature on the consequences of migration for individual migrants was characterised by a pessimistic view about the opportunities available to urban migrants in their places of destination. Their difficulties in adjusting to an urban environment and culture, their economic disadvantages compared to the native population, their inability to move upward in the cities, and their frustration were a constant theme. But many empirical studies in recent years have shown that the pessimistic view was highly exaggerated.

Studies in Chile, Colombia, India, Indonesia, Mexico, Nigeria, Sudan, Brazil and other countries, show that migrants on the whole appear to have increased their private (and/or household) welfare as a result of migration in spite of high and rising levels or urban unemployment. 8/ These studies also show that by and large, migrants experience upward occupational mobility or improvement in job status, often reaching and in some cases even surpassing the levels attained by residents of the place of destination. A number of ILO studies on the integration of migrants have produced mixed results; in the Sudan and Brazil, migrants were disadvantaged at the time of arrival in urban areas, but eventually they attained economic status comparable with that of urban residents having the same personal characteristics; however, this did not appear to be the case in and around the Caribbean. 9/

There is also some evidence that many of the migrants share part of their benefits with rural relatives through cash remittances. A recent survey of the migration literature quotes evidence from several household surveys in different

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8/ See, for example, Sally Findley, op. cit., p. 24; and L. Yap: "Internal migration in less developed countries: A survey of the literature", Urban Poverty Task Force Paper (Washington, DC, The World Bank, 1975).

9/ See A.S. Oberai: "Migration, unemployment and the urban labour countries suggesting that the migrants do send home remittances regularly. 10/ In some cases these remittances raise the average income of out-migrant households by 10-30 per cent. 11/

Thus, if one considers only the welfare of the migrants themselves in the cities or the members of their family remaining in the rural areas, policies to curb migration may not be appropriate. However, large concentrations of population and economic activities in a few cities entail numerous social costs and lead to a breakdown of services and related urban problems. Similarly migration to the cities does not leave the rural areas unaffected, the selectivity of the migration process may not only draw away the most dynamic elements of the rural society, but in addition, could divert national investment resources towards the towns. Thus even though the individuals may benefit from migration, this does not mean that the community will eventually benefit once the direct and indirect social costs and benefits are taken into account.

Consequences of migration for rural areas. 12/

In a dualistic model of development, rural out-migration has two immediate effects. First, a sizeable surplus is generated in the industrial sector which provides the necessary physical and working capital for development. Second, a declining labour/land ratio is conductive to changes in rural production techniques. In addition, the transfer of labour into the more productive, urban activity eventually generates a growing demand for rural output and thus alters the rural-urban terms of trade, raising agricultural prices relative to those of urban goods. The increase in agricultural prices in turn is likely to stimulate agricultural production and raise rural incomes. Remittances from urban areas are also likely to raise rural incomes and may not only increase levels of consumption but may also encourage technological change that further raises rural incomes. This, however, depends on the size and frequency of remittances and the use to which remittances are put.

10/ O. Stark: "Rural-to-urban migration and some economic issues: A review utilising findings of surveys and empirical studies covering the 1965-1975 period", Population and Employment Working Paper No. 38 (Geneva, ILO, 1976).

11/ See, for example, A.S. Oberai and H.K. Manmohan Singh: "Migration, remittances and rural development: Findings of a case study in the Indian Punjab", International Labour Review, Vol. 119, No. 2, March-April 1980.

12/ For effects of migration on rural areas, see A.S. Oberai: "Determinants of rural-urban migration and its implications for rural areas with special reference to ILO research", in Economic and Demographic Change: Issues for the 1980's, Proceedings of the Conference, Helsinki, 1978 (Liège, IUSSP, 1979); also see Jacques Gaude and Peter Peek: "The economic effects of rural-urban migration", International Labour Review, Vol. 114, No. 3, November-December 1976.

But the net effect on rural incomes will depend on the ability of the rural community to adapt and change traditional divisions of labour and on the type of technological change that follows rural out-migration. The increased demand for agricultural production together with the reduced supply of labour may push up the agriculture wage rate. The rising cost of agricultural labour will provide a stimulus for the large farmers to adopt labour-saving technology. Migration may thus foster as well as reflect greater inequality in the distribution of land, through the demise of small family farms and the increased ability of large farmers to save and shift towards relatively higher land/labour and capital/labour ratios. If so, total output may even fall. This is because the output per acre tends to be greater on small farms, as many studies have shown, even though the productivity of labour and machinery tend to be higher on the larger farms. 13/

Rural out-migration will also influence the distribution of income in rural areas. A priori it is difficult to state unequivocally whether migration tends to equalize the household income distribution in rural areas since it will depend on the period over which an assessment is made and on whether indirect as well as direct effects are considered. Above all it will depend on the type of households which predominate in the migration flows. If remittances go to relatively prosperous farmers, who can, as a result, introduce technological innovations leading to higher output and incomes, migration will tend to increase inequality in income and land ownership and may induce further migration. If however, it is the very poor who migrate as whole families, then the beneficial effect on rural wages may reduce rural income disparities.

The effects of migration on rural areas

Micro-economic studies have focused on the amount and use of remittances which migrants send home, and on the effect of migration on the rural production process. Some authors have also drawn inferences from micro-economic data about the distribution of income.

Evidence regarding the scale of urban-rural remittances in relation to rural income is conflicting. Some empirical studies suggest that they are sizeable, while others find that migrants hardly send any remittances at all. 14/

The evidence on the use of migrants' remittances is much more limited. A recent study in the Indian Punjab found that a significant proportion of households receiving remittances had used them for productive investment. 15/ This

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13/ A.R. Khan et al., op. cit.

14/ Michael Lipton: Migration from Rural Areas of Poor Countries: The Impact on Rural Productivity and Income Distribution, paper prepared for IBRD Research Workshop on Rural-Urban Labor Market Interactions, Washington, February 1976.

15/ A.S. Oberai and H.K. Manmohan Singh, loc. cit., p. 240.

was particularly true of cultivating households, which had investment opportunities in the rural areas. Another study of a village in Uttar Pradesh in India found that remittances had facilitated a shift to crops entailing higher risk and demanding greater investment. 16/ A study of small farmers in Uganda and Kenya 17/ concluded that urban-rural remittances constituted a significant source of working capital. On the other hand, a study of peasants in Asia showed that remittances did not have a significant impact on the switch from traditional rice to cash crops. 18/ Other authors 19/ have doubted whether remittances are used productively, though without providing much empirical evidence.

On the basis of data from household surveys, several authors have drawn inferences about the effect of rural-urban migration on income distribution. Some 20/ conclude that not only do rural-urban income disparities increase but the income distribution within the rural areas becomes more concentrated as well. Others 21/, using a micro-economic framework, argue that rural-urban migration will lead to greater equality in income distribution both within and between rural and urban areas.

The net effect of the departure of labourers on the rural production process is also unclear. It has been suggested that it is largely the young, able and ambitious who are motivated to leave the rural areas, which are thus deprived of their most dynamic people, those most likely to adopt technical innovations, for example. Indeed, the evidence from most migration surveys does seem to indicate that the typical migrant is in his twenties. However,

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16/ S.R. Simon: Changes in Income Consumption and Investment in an Eastern Uttar Pradesh Village, 1954 to 1964-5 (Cornell University, 1966, unpublished Ph.D thesis).

17/ A.R. Waters: "Migration, remittances, and the cash constraint in African smallholder economic development", Oxford Economic Papers, November 1973, pp. 435-54.

18/ This study is quoted in Stark, op. cit., p. 48.

19/ Lipton, loc. cit., and W.R. Böhning: "Some thoughts on emigration from the Mediterranean basin", International Labour Review, March 1975, pp. 251-77. Their presumption that migrants' remittances do not have a positive effect on rural production has been questioned on analytical grounds. See K. Griffin: "On the emigration of the peasantry", World Development, May 1976, pp. 353-61.

20/ Simon, op. cit., and Lipton, op. cit., also see Ram D. Singh: "Labour migration and its impact on employment and income in a small economy", International Labour Review, Vol. 116, No. 3, November-December 1977.

21/ Stark, op. cit., and Oberai and Singh, loc. cit.

no evidence exists that technological innovations are therefore less likely to be introduced. Similarly, whether migration leads to an increase in the labour supply of remaining family members or to the adoption of labour-saving technology remains a matter for speculation in the absence of empirical and analytical studies.

Finally, the limited empirical evidence available on internal terms of trade does not support the theoretical contention that rural-urban migration will increase the demand for rural output relative to the demand for industrial output. 22/ Several authors characterise the observed migration as a shift from rural to urban underemployment. The low productivity of these migrants in the urban informal sector means they do not represent a growing demand for rural production. Further, the urban informal activity is unlikely to generate significant forward and backward linkages of benefit to rural production. Several others have drawn similar conclusions that the nature of the rural-urban population transfer in recent years is not suitable to generate an urban industrial led development effort. 23/

The evidence concerning the effects of migration at the household level or for the rural community is rather limited. This is partly because most surveys have been designed to elicit information on its determinants. Moreover, most studies have analysed migration only at the micro economic level.

Studies which investigate the consequences of migration at the macro-economic level have been carried out in Morocco, Brazil, the Republic of Korea, and the Philippines. 24/ The Moroccan study concludes that higher rates of rural-urban migration lead to an increase in total real income and that, as a

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22/ D. Byerlee and C.H. Eicher: "Rural employment, migration and economic development: Theoretical issues and empirical evidence from Africa", in Nural Islam (ed.): Agricultural Policy in Developing Countries (London, MacMillan, 1974).

23/ See, for example, H. Rempel and R.A. Lobdell: "The rural impact of rural-urban migration" (Geneva, ILO, 1976), mimeo.

24/ Two of these concern migration specifically. See M.T. Mertaugh: The Causes and Effects of Rural-Urban Migration in Morocco, 1960-70 (University of Michigan, 1976, unpublished Ph.D. thesis); and L. Yap: "Internal migration and economic development in Brazil", Quarterly Journal of Economics (Cambridge, Massachusetts, February 1976), pp. 119-137, a summary of the author's unpublished Ph.D. thesis (Harvard University, 1972) with the same title. The other two studies are based on large-scale models of the economies of the Republic of Korea and the Philippines; these models were not constructed to study migration only but other factors as well. Both studies are referred to in I. Adelman et al: The Political Economy of Egalitarian Growth (Geneva, ILO, 1976), mimeo. A detailed account of each study can be found respectively in I. Adelman and S. Robinson: Income Distribution Policies in Developing Countries (Palo Alto, Stanford University Press, 1976), and in G.B. Rodgers, M.J.D. Hopkins and R. Wéry: Population, Employment and Inequality: BACHUE-Philippines (Farnborough, Saxon House, 1978) result of these higher rates, the share of urban goods produced in the traditional sector increases and the growth rate of agricultural output declines. Unfortunately, owing to a lack of data, this study does not examine the effect of migration on income distribution. The study of migration in Brazil finds that it has been a positive factor in the country's postwar development. A lower rate of migration would have resulted in a declining growth rate of per capita production. More importantly, the study also shows that increasing the rate of migration equalizes the distribution of income between the urban and rural sectors. According to the author 25/, this stems from the fact that increased migration raises agricultural productivity while also stimulating industrial growth, and that a higher rate of migration increases the agricultural wage faster than the urban one. At the same time the urban population expands faster than the rural, so that the per capita income in the urban sector does not rise as fast. This conclusion, as the author points out, refers only to wage income, not to profit income. Depending on the ownership of profits, migration may ultimately produce an increased disparity between rural and urban incomes.

Studies on the Republic of Korea and the Philippines both reach the conclusion that lower rates of rural-urban migration worsen the rural-urban distribution of income, including profits. On the other hand they show different results with respect to the distribution of income within the rural sector. The study on Korea finds that rural incomes are more equally distributed as a result of migration, while that on the Philippines concludes that migration leads to a less egalitarian distribution of rural income, but that the increased rural inequality is outweighed by increased equality in urban areas. 26/

It is clear from the foregoing discussion that no definitive statement can be made on whether rural-urban migration is beneficial or harmful to rural development. Further research is required in this area. Nevertheless, the

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25/ Yap, op. cit., p. 136.

26/ For further details of the macro-economic analysis, see J. Gaude: "Causes and repercussions of rural migration in developing countries: A critical analysis", World Employment Programme Research Working Paper (Geneva, ILO, 1976, restricted document).

results of macro-economic studies suggest that the evaluation of the economic and social impact of rural-urban migration must be made in a general equilibrium framework in order to capture the migration effects on the rural sector as well as on the urban sector. 27/ In other words, conclusions drawn from studies based on partial cause and effect relationships may be misleading especially where there are feedback effects.

Consequences of migration for urban areas

The economic effects of migration on the receiving cities are even more difficult to unravel. These are primarily determined by assessing differences in various economic indicators before and after migration. The measures most often used are changes in the employment levels, occupational structure, income levels, industry mix, savings and capital accumulation levels, and government revenue and expenditure levels. However, this method of analysis is not conclusive for separating changes due to overall population growth from those due solely to migration. Some studies have, therefore, attempted to resolve this issue by comparing how non migrants and migrants have fared economically over time.

Many observers have expressed fears that migration is a major cause of rising urban unemployment, fragmentation of the urban labour market into traditional and modern sectors, overcrowded housing and a relative shortage of public amenities. The growing presence of migrants in urban areas, particularly if they are unemployed, has not only economic and social implications, but also political repercussions in both the areas of origin and destination. Migrants unable to find adequate employment or any employment at all are forced to live in squatter settlements or inner-city slums lacking even the most basic facilities. The pressure on the residential land causes land speculation and excessive rents and generally tends to depress living standards in the urban areas.

Such fears may not, however, be justified. A priori it is not possible to conclude that unemployment will rise, since it will depend on whether migrants contribute more to the supply of labour or to the demand for labour. 28/ In

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27/ A linear programming model called Bicoa is being developed for the economy of Ecuador as part of the migration and employment research programme at the ILO. For details see P.A. Cornelisse, J. Gaude and P. Antolinez: "The Bicoa model: A socio-economic model of causes and effects of rural-urban migration in the Sierra of Ecuador", World Employment Programme Research Working Paper (Geneva, ILO, 1978).

28/ A.S. Oberai, 1980, op. cit.

fact, there are several means by which migrants may directly or indirectly raise employment. First, they may lower wage rates in urban areas and this may lead to an expansion of employment. Second, the increased supply of unskilled and semi-skilled labour may stimulate more rapid industrialisation and industrial investment. Third, their consumption patterns are more likely to be oriented towards goods produced by relatively labour intensive methods of production. And finally, they may provide dynamic elements in the urban informal sector, providing entrepreneurship, skills and small-scale working capital. For these reasons unemployment may not rise as a result of migration.

Several studies have shown that migrants have lower rates of unemployment than natives. 29/ But low unemployment rates among migrants may or may not lead to increased unemployment among natives. If jobs taken by migrants are those which natives do not take, native unemployment levels may be unaffected.

Migration into large cities may also have some effect on wage levels as well as on technological change. Under perfect free-market conditions, the excess labour in the urban employment markets should lower wage rates, as workers compete with one another for available positions. However, labour markets do not operate entirely on the basis of demand and supply principles. 30/ But to the extent that wages are flexible downwards, technical change is more likely to be labour-using for any given cost of capital. However, if capital goods are imported and the exchange rate overvalues local currency, capital goods will be relatively cheap and rural-urban migration may not lead to the introduction of labour-using technical change. 31/

Some studies have postulated economies of scale resulting from the massive entry of migrants into urban areas. First, their numbers may bring a city into a size range which allows more efficient provision of services. Second, the migrant addition to the labour force may result in greater specialisation and increased labour productivity. This specialisation of the labour force, along with improved city services may result in higher levels of productivity for firms, permitting those operating in larger cities to become more specialised and to adopt larger scale operations.

29/ See Sally Findley, op. cit.

30/ See, for example, Alan Simmons et al: Social Change and Internal Migration: A review of Research Findings from Africa, Asia and Latin America (Canada, IDRC, 1977).

31/ See, for example, Gaude and Peek, op. cit.

Most studies agree that there are economies of scale associated with supplying services to concentrated populations. However, differences of opinion arise when researchers attempt to define the optimum city size. 32/

The net economic impact of migration on the urban areas largely depends on the types of migrants involved, and on their characteristics. Since the youngest and most productive individuals tend to migrate, we may expect that they will benefit their destination areas by increasing the proportion of the labour force in prime working ages. Further, if migrants bring skills with them needed in the areas of destination, these areas will benefit in so far as they are able to utilise skilled manpower educated at the expense of the areas of origin.

Aside from the contribution to urban growth, migration can have other demographic impacts. Since migration is generally selective for younger persons, this would tend to lower crude death rates. Younger migrants may also increase the share of persons in their early working years, swelling the younger, less experienced portion of the labour force. If migration is not heavily male selective, young migrant women may also increase the proportion of urban women in the peak childbearing years. Such changes in the age and sex composition of the population can have important implications for urban unemployment rates, crude birth rates, and crude death rates.

Several studies have found negative statistical association between urbanisation and fertility. This has led many observers to conclude that rural-to-urban migration has a depressing effect on the national fertility rate. The issue turns on the question of whether the fertility of female migrants would have been higher had they remained in a rural area. Research on the topic has usually involved comparing migrants with rural women of similar characteristics, and for the most part the latter have more children at an equivalent duration of marriage.

For example, a recent study in the Indian Punjab shows that families in urban areas desire as well as have a smaller number of children than those in rural areas. 33/ The study further shows that migrants to the urban areas have slightly higher fertility than the natives but lower fertility than rural stayers. In the rural areas, out-migrants and returned-migrants have lower fertility than non-migrants. It has also been observed in the Punjab study that migrants tend to marry at a later age and separation has the effect of lowering their completed family size.

32/ Sally Findley, op. cit.

33/ For details and discussion on the mechanisms through which migration influences fertility, see A.S. Oberai and H.K. Manmohan Singh: "Migration, urbanisation and fertility: The case of Indian Punjab" (Geneva, ILO, 1980), mimeo.

Chapter 12 *

DETERMINANTS OF LABOUR FORCE PARTICIPATION

Introduction

The size of the labour force is a reflection of the size and age-sex composition of the population, the proportion of various groups who are "economically active", and the statistical ambiguities associated with measuring economic activity. The labour force is some proportion of the "working age population", which is measured by reference to some age determined by statistical convention. In industrialized countries typically those under the age of 14 are excluded, whereas in agrarian low-income countries the age of 10 or less is often selected. Having chosen an age threshold, measuring the labour force requires a conceptualization of the labour force participation rate. This in turn requires identification of employment and, more problematically, unemployment and various types of non-wage-earning types of economic activities, such as unpaid family or non-family labour force work, and self-employment. There is no national consensus with regard to these definitional ambiguities, therefore any review of patterns and determinants of labour force participation must be tentative. 1/ In that context, this chapter will review patterns of participation and identify the principal demographic and socio-economic determinants of activity patterns.

Age-Sex Pattern of Labour Force Participation

In low-income agrarian economies most people contribute to subsistence from an early age, even if the regularity and intensity of work are low compared with that experienced by adult workers in economies where wage labour has become the norm and industrialization has progressed extensively. The extent of child labour force participation has been chronically understated by conventional census and survey data, but according to an estimate by the ILO Bureau of Statistics, some 55 million children were employed

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1/ For reviews of the statistical ambiguities, see G. Standing, Labour Force Participation and Development (Geneva, ILO, 1978), pp. 25-54; R.B. Anker, Research on Women's Roles and Demographic Change: Survey Questionnaire for Households, Women, Men and Communities with Background Explanations, (Geneva, ILO, 1980).

* Prepared by the International Labour Organization.

world-wide in 1975; and subsequent analysis suggested that this figure was too low by a considerable margin. 2/

Children tend to work in areas of peasant farming, though they have also been employed extensively on plantations, in "informal" streetside activities, as "sweated" labour in small-scale manufacturing, and in a wide-ranging set of tasks from mining to construction work and carpet making. The determinants of their involvement in economic activity are found in the structure of production, the extent of poverty, which makes child labour essential for families to have a chance of survival, the growth of mass unemployment, and the wide-spread illiteracy and lack of schooling found in many parts of the world. 3/ Though the process is protracted and uneven, economic growth and industrialization, with their associated shift to higher levels of school enrollment and the formalization and standardization of work relationships, lead to a decline in child labour force participation rates. However, it has to be recognized that despite extensive legislation designed to prevent it and widespread international condemnation of various practices associated with it, child labour persists in many guises in many parts of the world and can be expected to continue for many years to come.

Men : Most men above the age of 14 participate in the labour force, the exceptions being those still undergoing some form of schooling, those who have retired, the relatively small proportion who cannot secure work because of physical or mental disadvantages, and some unemployed men who become discouraged from seeking employment in any form of economic activity. The final category overlaps with the other three. For example, many elderly workers "retire" earlier than intended because they cannot find employment once they become unemployed, a common feature in industrialized countries, whereas some youths indulge in "informal" studying as a second choice activity because they cannot secure employment, a phenomenon that is wide-spread in low-income countries as well as in industrialized countries. These caveats aside, the aggregate "crude" labour force participation rate of men tends to decline logistically with economic

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2/ ILO Yearbook of Labour Statistics (ILO Geneva, 1978); ILO, Children at Work (Geneva, ILO, 1979).

3/ For analyses of the social, economic and cultural determinants of child labour force participation, see Gerry Rodgers and Guy Standing (eds.) Child Work, Poverty and Underdevelopment (Geneva, ILO, 1981).

growth and industrialization, being highest in low-income agrarian countries with fairly rapid declines initially in the youngest and eldest age groups, followed by periods in which there are only slight additional declines. Age - standardized activity rates for men have been fairly similar in industrialized countries, though they have been relatively low in the socialist countries of Eastern Europe due to late labour force entry and reasonably early retirement. 4/ In general, however, the pattern has been for most men to spend their adult years in the labour force; a pattern much less common for women.

Women : Any generalization about the patterns or trends of female labour force participation is likely to be misleading. But very briefly, in low income countries there seems to have been a fourfold pattern. In some countries women's labour force participation is low in both rural and urban areas; this has been the case in most Arab Moslem countries. In others, the recorded participation rates have been relatively low in rural areas, and much higher in urban areas; this has been a quite common pattern in Latin America and the Caribbean. In a third group of countries, rural activity rates have been very high, whereas urban rates of participation have been much lower; this pattern has been fairly common in sub-Saharan Africa and India. Finally, there have been countries where recorded female labour participation activity has been high in both rural and urban a areas; this is characteristic of a number of South-east Asian countries.

With industrialization, some observers have detected a U-shaped pattern, with female labour force participation declining initially and then rising in later stages of industrialization. But given the diversity of patterns in low-income countries, such a generalized trend is highly dubious. Clearly, women in industrialized countries have been gradually drawn back into the labour force in recent years. Furthermore in the socialist countries of Eastern Europe, age-standardized female activity rates have been consistently high, higher on average than in the other industrialized countries or in low-income countries, although higher rates have been recorded in a few of the latter.

4/ J.D. Durand, The Labour Force in Economic Development: An International Comparison of Census Statistics (Princeton University Press, 1975), pp. 50-51.

There has been no common age pattern describing female labour force participation. In some countries the activity rate reaches a peak in the 15-19 age group, some in the 20-24 age group, and some in the 50-54 age group, and in some countries such as the USA there have been two peaks, one before the onset of child-bearing and another some years later. [5] Overall female labour force participation has risen dramatically in recent years in a number of industrialized countries, and the age pattern has become much more like of men in these countries, primarily because married women have become more regular and committed labour force participants. This trend is expected to continue.

Socio-economic determinants of female labour force participation

The extent to which women have participated in the labour force has been influenced by economic, cultural and demographic factors. At the macro level, the structure of the economy, the extent and incidence of poverty, sickness and malnutrition, the prevailing social and production relations, the class structure, the inequality of income and wealth, and the corresponding structure of the labour market have interacted in their impact on patterns of participation and the sexual division of labour. At the micro-behavioural level, the impact of socio-economic factors is transmitted through household and personal characteristics which act as constraints and incentives to economic activity. Most recent economic and sociological research has focussed on the latter factors, much of it conducted in terms of the "new home economics". However, forms of individual choice must be seen as secondary to the influence of structural factors.

The industrial-occupational structure has been cited as influencing the sexual division of labour and level of female labour force participation, but while women have tended to predominate in tertiary activities, and men in manufacturing and agriculture, it remains a fact that women have predominated in many farming systems, notably in large parts of Africa where their role has been intensified by the rural migration of a large proportion of the male population. The shift to wage labour in agriculture, tended to squeeze women out of farming, though they were occasionally required to do seasonal, casual, relatively low-income tasks. Mechanization has also weakened their position. 6/ However, technological explanations of female labour force participation would be inadequate, for women have been found to work in all types of industry and all occupations to a widely varying degree. That does not mean that the nature of the job has not been a significant factor, only that crude occupational-industrial explanations are inadequate. One major determinant of women's economic activity is clearly the level of aggregate demand, for in times of depression and rising unemployment there has been a widespread tendency for women to be pushed to the margin of the work force, replaced by men in some jobs and discouraged from attempting to get any employment by the high level of unemployment and the low wages being offered.

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[5] On the different age patterns see Standing, 1978, op. cit., pp. 16-24; Durand, 1975, op. cit., pp. 37-44.

An associated factor has been the relative incomes available to men and to women. In many industrializing countries wide differentials have developed between "prime age" adult male workers and youths, and between adult men and women. Such differentials have developed for various reasons, but one effect has been to encourage a greater division of labour between age-sex groups, with the result that women have tended to withdraw from the labour force.

The influence of incomes on labour force participation partly reflects the need for purchasing power and partly the incentive to work. In many low-income countries, workers have been driven into the labour force by the need for cash to pay taxes, debts or for newly commoditized subsistence goods. But within the higher income families the need for the income of members other than the main income earner is reduced, and in both industrialized and industrializing countries there has been a strong tendency for women whose husbands have relatively high incomes to have a relatively low propensity to participate in the labour force. This has been widely documented in low-income and industrialized countries. For example, numerous studies in the USA have reported some type of inverse relationship. 7/ However, it is notable that as women have become less of a "secondary" labour force, and as the incomes of men and women have become more equal, the strength of the inverse relationship has declined.

6/ E. Boserup, Women's Role in Economic Development (London, Allen Allen and Unwin, 1970).

7/ See, for instance, W. Bowen and T.A. Finegan, The Economics of Labour Force Participation (Princeton, Princeton University Press, 1969).

This was predicted long before it was apparent in the data, for one study conducted in 1962 suggested that the positive elasticity of women's labour force participation with respect to a change in women's wage rates was about four times as great as the negative effect of an equivalent rise in the husband's income. 8/ A related aspect of research in the USA has been the suggestion that proportionate increases in the after-tax market wage opportunities of both the husband and the wife leads the wife to allocate relatively more time to non-labour market activities during the middle years of her life, probably to child rearing and to allocate relatively more time to labour force activities before and after that stage. 9/

In low-income countries, studies in Chile, Puerto Rico, Jamaica, the Philippines, Israel, Sri Lanka, Peru and the Sudan - among others - have found inverse relationships between men's income and female participation, in spite of data short-comings. 10/ But some studies have failed to find such a relationship, notably one in Kenya, where controlling for various personal, household and labour market variables, married women's labour force participation was positively related to a variable measuring family income per equivalent adult, less the woman's contribution. 11/ This was attributed partly to labour force contacts and to the access to jobs by women from relatively high-income families. Other studies, including one conducted in the Philippines and another in Singapore, have found no statistically significant relationship. 12/ So, empirically the inverse relationship between household income and female labour force participation remains in question.

8/ J. Mincer, "Labour Force Participation of Married Women: A Study of Labour Supply" in H.G. Lewis (ed.), Aspects of Labour Economics (Princeton, NBER, Princeton University Press, 1962).

9/ T.P. Schultz, Estimating Labour Supply Functions of Married Women, (Santa Monica, California, Rand Corporation, 1975), p. 79.

10/ These studies are reviewed in Standing, 1978, op. cit., pp. 74-88; G.B. Rodgers, "Female Labour Force Participation in Peru : An Analysis Using the World Fertility Survey", Population and Employment Working Paper No. 96, (Geneva, ILO, 1980).

11/ R.B. Anker and J.C. Knowles, "Female Labour Force Participation in Kenya" in G. Standing and G. Sheehan (eds.) Labour Force Participation in Low-Income Countries (Geneva, ILO, 1978).

12/ A.J. Harman, Fertility and Economic Development of Families in the Philippines, (Santa Monica, California, Rand Corporation, 1970); E.F. Pang, "Labour Force Growth, Utilization and Determinants in Singapore", in Standing and Sheehan, 1978, op. cit.

The impact of women's income is much clearer. If wages improve for women or if income-earning opportunities emerge, their labour force participation will be greatly enhanced. This result has emerged from studies in Chile, Puerto Rico, Peru, Jamaica, Thailand, Sri Lanka and Yugoslavia, among others. And there is little doubt that this is a primary determinant of female labour force participation almost everywhere.

It is commonly assumed that increased schooling encourages greater labour force participation, and that as, or if, female education levels start to catch up with those of men, female labour force participation will increase. This seems likely but the causal process is again not very clear. Does that occur because discrimination against women in wage employment declines or is it merely the result of greater access to education-requiring jobs ? At the individual level the relationship between schooling and the probability of labour force participation is also unclear. Schooling may raise the 'opportunity cost' of inactivity and thus induce labour force participation, or it may merely increase employment opportunities, or it may influence the labour supply by increasing income aspirations. None of these hypotheses stands up to critical scrutiny when trying to explain a straight-forward positive relationship. 13/ One factor is that relatively educated women tend to be married to relatively educated men earning relatively high incomes. But more fundamentally, when few women have such levels of schooling, access by such educated women to jobs predominantly occupied by men is restricted by various forms of discriminations. Moreover, women with fairly high levels of schooling who, because of discrimination or some other constraint, would be obliged to accept work below that for which they are qualified or to which they feel entitled, are quite likely to withdraw from the labour force.

Empirically, some statistical studies of women's work behaviour have reported a straight-forward positive relationship between some index of education and some measure of the probability of labour force participation. These have included studies conducted in Argentina, Chile, Puerto Rico, Venezuela, Costa Rica, Mexico, Jamaica, Nigeria, Ghana, Kenya, Sudan, Egypt, Thailand, Sri Lanka, the Philippines, Papua New Guinea and Singapore. 14/

13/ G. Standing, "Education and Female Labour Force Participation", International Labour Review, Vol. 114, No. 3, November-December 1976, pp.281-297.

14/ Studies reviewed in Standing, 1978, op. cit., pp. 146 - 163.

But in some of these studies, the effect has been a non-linear one, or has only been observed beyond some threshold level of schooling. 15/ In many studies, the nature of the variable used to assess the impact of schooling has not allowed for the possibility of identifying a non-linear relationship. This was so in one analysis of women's economic activity in urban Chile, where women with a secondary school education had the lowest average rate of labour force participation of all eduation groups. 16/ Other studies have either found no particular association or even an inverse relationship, so expectations that with increased education, female labour force participation will be increased should be tempered by caution. It seems likely that schooling will lead many more women to enter the labour force, but this will depend on their ability to secure the types of jobs to which they fell entitled and capable of performing. High levels of unemployment and persistent discrimination will greatly reduce that positive effect.

Fertility : It has long been hypothesized that there is a strong inter-relationship between fertility and female labour force participation, and in low-income countries great policy significance has been attached to the desirability of raising female labour force participation, to reduce fertility and thus population growth. This indeed has strongly influenced policy prescriptions and has recently received further empirical support from comparative analysis of data from the World Fertility Survey. The results from that analysis suggest that in Mexico, for instance, women without work experience can be expected to have had an average of 7.2 children after 25 years of married life; women working on family farms or in family businesses would have had an average of 6.4 children, while those who work in wage employment would have had only 5.3 children. 17/ In various other countries, ranging from Indonesia to Jamaica, the association was equally strong, though it is notable that no such effect was observed in Pakistan and Kenya. Earlier studies have tested numerous variants of this view, with occasional findings that raise questions about the supposed

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15/ W. Pecht, "Participation of Married Women in the Urban Labour Market in Selected Latin American Countries: Chile, Costa Rica, Ecuador and Venezuela", in Standing and Sheehan, 1978, op. cit.

16/ N. Youssef, Women Working in Developing Societies, (Berkeley, Institute of International Studies, University of California Press, 1973), p.58. One difficulty with this finding was the lack of oontrol variables used.

17/ G. Rodriguez and J.G. Cleland, Socio-economic Determinants of Marital Fertility in Twenty Countries : A Multivariate Analysis, (London, World Fertility Survey, Paper presented to WFS Conference, Wembley, July 1980).

causal relationship, especially bearing in mind that many types of job and work status involve little incompatability between child bearing or child rearing and labour force participation. Furthermore women's economic activity means that families are better able to afford the costs of having children.

There are also theoretical difficulties with simple hypotheses suggesting that fertility reduces female labour force participation. Various studies have attempted to determine when fertility is most likely to constrain female labour force participation and to identify factors that influence the strength of the underlying relationship. Not surprisingly, it seems that if women work for "instrinsic reasons", in other words out of interest in the work rather than primarily out of necessity, the constraining influence tends to be relatively weak. But even this is theoretically questionable, in so far as women working out of necessity will have even greater need once they have had children. Three factors seem most likely to have a systematic influence on the relationship between fertility and female labour force participation. First, in societies where the family size norm is large, young women will typically be excluded from most 'career' jobs and even job training; the discrimination arising from the expectation that women will experience a series of pregnancies that will make them into secondary, intermittent labour force participants. Thus, indirectly, the high level of societal fertility would tend to reduce the level of female economic activity, at least in wage employment, by reducing the range of jobs open to women and by reducing their opportunity incomes. Conversely, if the fertility norm is low, job opportunities for women would tend to open up, and then employers and governmental organizations might be more likely to institutionalize the child caring role during the working day, so reducing the constraining influence of fertility on women's employment.

Second, in rural low-income areas in particular, high levels of fertility imply the existence of a source of child labour which can be substituted for that of women. In those circumstances, effective restriction of child labour would allow greater female labour force participation and encourage lower levels of fertility, primarily by increasing the costs of child bearing. So, in these cases, rising female labour force participation would be correlated with declining fertility.

Thirdly, the child-care constraint on female economic activity will depend, of course, on the availability and cost of alternative child-care arrangements. This will depend on the extent to which the extended family or kinship network is operative; for higher-income households, it will also depend on the availability and supply price of domestic servants, which is mainly a function of the female opportunity income in agriculture. Where that income is low, rural emigration of women will be substantial, as has been the case in most of Latin America and the Caribbean, as well as in a number of other countries; in these circumstances, the labour force participation of women in high-income households is unlikely to be constrained much by the presence of young children. 18/

These are only some of the main factors that theoretically can be expected to influence the strength of any inverse relationship between fertility and female labour force participation. Given the diversity of institutional factors that impinge on the underlying causal relationships, it is perhaps not surprising that empirical research has continued to yield somewhat conflicting results.

In industrialized countries, most notably the United States, numerous studies have found an inverse correlation between indices of fertility and indices of women's work. This was also found in Canada, Czechoslovakia, England, Hungary, Sweden and West Germany. Unfortunately, most of these studies have left the causal relation and even the direction of the inverse correlation unclear. A formidable body of econometric evidence, from the United States and other industrialized countries, has suggested that controlling for other personal and household factors, the presence of children has depressed female labour force participation. But interestingly, there is some evidence that, in the United States and the United Kingdom at least, the influence of children on female labour force participation has been declining. 19/

In low-income countries the inverse relationship has not been observed nearly so uniformly, partly it is supposed because of the higher degree of "role compatability" between fertility and female economic activity in rural, non-wage based production. Some studies have reported a negative effect of fertility, including analysis of census or survey data from Chile, Puerto

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18/ Besides other studies cited below, see the descriptive studies contained in S. Kupinsky (ed.), The Fertility of Working Women (New York, Praeger Publishers, 1977).

19/ R.H. Weller, "Wife's Employment and Cumulative Family Size in the U.S., 1970 and 1960", Demography, Vol.14, No.1, February 1977, p.6; J.S. Wabe, "Labour Force Participation in the London Metropolitan Region", Journal of the Royal Statistical Society, Series A, Vol. 32, Part 2, 1969, pp. 245-264.

Rico, Argentina, Brazil, Thailand, the Philippines, Yugoslavia, Papua New Guinea and Singapore. 20/ But some of these studies showed only a correlation not a clear uni-directional relationship. Other analyses failed to find any statistical relationship. 21/ And others have even suggested a positive relationship, notably in areas dominated by subsistence agricultural activity where the incompatability between having children and contributing to family production is minimal. In studies of rural areas of Ghana, Nigeria and Kenya, there was indeed some suggestion of a positive relationship, if any.

It seems a negative relationship is much more likely in urban areas, and it is significant that in a few countries different effects have been observed in rural and urban areas. With regard to the latter, several studies have reported negative relationships - in Costs Rica, Venezuela, Kingston in Jamaica, Khartoum in the Sudan, Turkey and in a few other countries. However, the difficulty of attributing a causal explanation has persisted and researchers have been concerned with identifying the factors that determine the extent to which fertility reduces the probability of different types of female labour force participation. Besides the differential effects of type of job and type of work status, and the impact a period of 'interruption' of employment would have on life-time earnings, the effect of schooling on the relationship is worth considering. If schooling is taken as an indicator of access to particular types of work and of the extent of labour force commitment, an increase in education can be regarded as weakening the negative effect of fertility on female labour force participation. Although evidence is sparse, it is perhaps significant that in a study of the determinants of labour force activity of women in Santiago, Chile, the more educated women tended to have a higher participation rate than the less educated women for each level of fertility, and that in particular, an increase in family size seemed to have a proportionally greater effect on participation the higher the level of schooling. Rather more significantly, a survey of Polish women showed that the proportion of women workers back at work within six months of having a child was highest among the highly skilled. This seems likely to be a general pattern whenever any prolonged interruption of employment would have a pronounced negative effect on the women's future as well as current earnings potential.

20/ For a review of these studies see Standing, 1978, op.cit.,pp.184-205.

21/ See, e.g., P. Peek, "Family Composition of Married Female Employment: The Case of Chile", in Standing and Sheehan, 1978, op. cit.; Harman, 1970, op. cit.

22/ M. Sokolowska, "Some Reflections on the Different Attitudes of Men and Women towards Work", International Labour Review, Vol. 92, No. 1, July 1965, pp. 35-50.

Migration : The other demographic factor that is closely related to the level and pattern of labour force participation is population mobility. One can distinguish different types of effects involved in that context. First, there is the impact of out-migration, typically by men leaving rural areas for seasonal or for longer periods, (that pattern tends to raise the female labour force participation in rural areas, as women have to take over an even larger proportion of rural production). Second, there is the impact of women's migration on their own labour force participation, and third, there is the effect on participation rates in the areas of in-migration and out-migration.

Research has only really shed light on the relation between migrant status and labour force participation, partly because of the methodological difficulties involved in studying the other, macro relationships. Because most adult migration is for "economic reasons", except when in connexion with retirement, it is to be expected that migrants have a relatively high propensity to participate in the labour force, both relative to those who remain in the area of out-migration and relative to those in the in-migration area. Although not all observers agree, there is evidence that this is indeed the case. In Peru, one analysis found that female migrants to Lima had a noticeably higher participation rate than non-migrants in the city; similar studies found much the same in Puerto Rico, Colombia and Chile.23/ Outside Latin America the research findings have been less clear. A study of migrants to Bombay found that migrants in each age group had a higher participation rate than non-migrants, but in a somewhat similar though more tentative Sri Lanka study, migrant status did not appear to have any effect on participation. 24/ The Sri Lanka result may have been due to the lack of control variables in the analysis and the necessary combination of rural and urban areas, but it should be noted that this is not the only study to have found little or no association. However, in general, the theoretical reasons are strong for expecting a positive relation between migrant status and the propensity of women to be in the labour force. What is less clear is the effect increasing labour migration on the participation rates of groups within particular areas. A priori, increasing population mobility can be expected to result in re-allocation of labour from areas where there are relatively few labour force opportunities to areas where more labour is required, and thus a positive relationship at the societal level is to be expected. It also seems likely that one effect

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23/ See, for instance, J.C. Elizaga, Migraciones a las areas metropolitanas de America Latina (Santiago, Chile, CELADE, 1970).

24/ These and other studies are summarized in Standing, 1978, op. cit., pp. 207-221. See also N. Youssef, et. al., Women in Migration: A Third World Focus, (Washington, International Centre for Research on Women, 1979).

of migration is the substitution of migrant workers for certain groups of "secondary" or relatively "marginalized" workers, such as youths, the elderly and certain groups with physical disadvantages. Certainly, research in industrialized countries has strongly suggested that in recent decades women workers have been steadily displacing these other groups, and with high rates of unemployment this type of substitution process seems likely to continue in both industrialized and industrializing countries, even though the groups adversely affected are not likely to be the same in all countries.

Concluding Remarks

In industrialized countries labour force growth in recent years has been largely due to the post 1945 "baby boom" and to the increasing rate of female labour force participation, notably among married women, which combined have more than offset the declining participation rate of men over age fifty. 25/ In low-income countries, the recorded rates of labour force growth have been partly statistical, in the sense that many activities conventionally regarded as outside the labour force have been replaced by non-domestic work, notably but by no means only, by wage employment. But more fundamentally the growth has been due to the rapid expansion of the working age population and the growth of female labour force participation.26/

Growing unemployment can be expected to slow down the rate of growth, but it will be many years before any reduction in the birth rates will in itself lead to a decrease in the number of new labour force entrants. Increasing levels of schooling and population mobility will probably increase labour supply, while declining levels of fertility will possibly increase the availability of women workers prepared to take labour force activity. Meanwhile, the prospects of translating the high rates of labour force growth into high rates of labour force absorption in productive and rewarding employment are bleak indeed.

25/ Economic Commission for Europe, Labour Supply and Migration in Europe: Demographic Dimensions 1950-1975 and Prospects (New York, United Nations, 1979); idem, The Economic Role of Women in the EEC Region (New York, United Nations, 1980).

26/ ILO, Labour Force 1950-2000: Vol. V, World Summary (Geneva, ILO, 1977).

Chapter 13

DEMOGRAPHIC ASPECTS OF CHANGES IN CONSUMPTION LEVELS AND PATTERNS

Development strategies which involve shifting the emphasis of investment from agriculture to non-agricultural activity are often based on an appeal to Engel's law which states that food expenditures will occupy a declining portion of household budgets as income rises and that non-food expenditures will therefore increase in relative importance.

However an application of Engel analysis in its simplest form may lead to less than optimal policy decisions. By focussing strictly on income elasticities of demand, a number of other relevant features of the development process are being ignored, particularly demographic change.

It is generally recognized that development is a multifaceted process which includes, but goes far beyond, an increase of per capita income. From the demographic point of view, it also involves an alteration in the rate of population growth, the number and composition of households as well as their rural-urban location. To properly project future patterns of demand it is therefore necessary to incorporate demographic factors into the analysis.

According to an FAO study 1/ population growth accounted for two thirds of the increase in the demand for food in developing countries while one third can be attributed to the growth in income. Though a smaller proportion of increases in income are spent on food in developed countries it is likely that population growth has a comparable effect on food demand in these countries.

Population growth is generally accompanied by changes in the number, size and age structure of households. All of these factors will have an impact on consumption patterns, as will the urban-rural distribution of the population.

Rural-urban migration is likely to influence consumption expenditures because of the rural-urban differences in consumption levels and patterns.

1/ FAO, Provisional Indicative World Plan for Agricultural Development, (Rome: Food and Agriculture Organization of the United Nations, 1970), Vol. I, pp. 12 - 13.

Furthermore in rural areas, food grains are cheaper in relation to other commodities and are often produced at home. These factors together with the greater variety and abundance of manufactured goods in urban areas lead to substantial differences between rural and urban consumption patterns. There are also significant differences in the types of food consumed in the two areas. Dietary surveys 2/ undertaken in developing countries indicate that the share of animal protein in total protein intake, is substantially higher in urban than rural sectors.

In order to illustrate the relative importance of population factors in determining consumption patterns, this study will derive a set of coefficients based on an analysis of consumption expenditures at the household level. 3/ These values will then be used to make heuristic projections of increases in the aggregate consumption expenditures of two selected countries given assumed values for per household expenditure, age structure, number of households and rural to urban migration rates.

The following section presents estimates of the sensitivity of household consumption patterns to changes in economic and demographic factors respectively. The succeeding section will present a scenario analysis which illustrates and decomposes the effects of projected economic and demographic conditions on consumption. The final section will be devoted to concluding observations.

A. Economic-demographic factors affecting household consumption

The point of departure for this analysis is the household 4/, the basic decision making unit in relation to consumption. In particular

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2/ FAO, "The impact of urbanization on food demand", Monthly Bulletin of Agricultural Economics and Statistics, Vol. 22, No. 9 (September 1973), p.5.

3/ This procedure is consistent with suggestions made at the twentieth session of the Population Commission, United Nations, Population Commission, Report on the Twentieth Session, 29 January - 9 February 1979.

4/ The household was used as the unit of analysis in the case of Pakistan and the family was used as the unit of analysis in the case of the Philippines. The household is a socio-economic unit composed of individuals who live together and share food and other essentials for living. The family consists of that part of a household who are related by kinship. It would not include, domestic servants, boarders or guests. See United Nations, Method of Projecting Households and Families, (United Nations publication, Sales No. 73.XIII.2), p.5. For purposes of exposition however the term household will be used to describe the unit of analysis in both countries.

household consumption functions will be estimated for rural and urban areas using as their arguments household budget and household size. The statistical results are presented in this section.

The data used to estimate the household consumption functions were taken from surveys of Pakistan in 1971-1972 and the Philippines in 1971. 5/ Prior to the analysis, the data were grouped according to income level. To facilitate inter-country comparisons the data were put on an annual basis and converted into U.S. dollars of 1971 purchasing power. 6/

Using generalized least squares regression analysis eight linear consumption functions were estimated for rural and urban households in each country. In each case four equations were fitted to the data. The dependent variables were : "food" and "non-food", "cereal" and "non-cereal" food expenditures.

Table 13.1 presents the estimated regression coefficients for household budget and household size. In the case of the Philippines household size was disaggregated by age group.

The household rather than the individual was adopted as the unit of analysis because many consumer expenditures, such as those for home rentals, are not divisible among individuals and therefore must be assigned to the household as a unit. Total household expenditures was used as a proxy for permanent household income, which is generally considered to be a more appropriate explanatory variable in consumption analysis than is current income. 7/

5/ Pakistan Household Income and Expenditure Survey, 1971-72, (Statistical Division, Ministry of Finance, Planning and Development, Government of Pakistan, December 1973) and Philippines Family Income and Expenditures: 1971. The BCS Survey of Households Bulletin Series No. 34 (Manila, Bureau of the Census and Statistics, 1973).

6/ The exchange rates used referred to the end of the year or the average of two years without taking into account the possible monthly variation of exchange rates. The exchange rates per U.S. dollar were the mid point rates of the years covered by the study, namely, 4.793 Pakistan rupees (1971), 11.031 Pakistan rupees (1972) and 6.43 Philippine pesos (1971), Statistical Yearbook, 1976, United Nations publication, Sales No. E/F.77.XVII.1), pp.695-697.

7/ See S.J. Prais and H.S. Houthakker, The Analysis of Family Budgets, (Cambridge, England: Cambridge University Press, Second Impression abridged, 1971), Chap.7.

Table 13.1. Coefficients of the estimated regression equations relating household (family) a/ expenditure to household budget, household size and its age structure, by commodities in urban and rural areas, Pakistan 1971-72 and Philippines 1971 b/.

	URBAN				RURAL			
		Household (family) size				Household (family) size		
Items	Household (family) budget	Total	Age under 18	Age above 18	Household (family) budget	Total	Age under 18	Age above 18
		(dollars per person)				(dollars per person)		
Pakistan 1971-72								
Non-food	.75	-30.59			.66	-20.21		
Food	.25	30.59			.34	20.21		
Non-cereal	.24	18.96			.26	11.57		
Cereal	.01	11.63			.07	8.64		
Philippines 1971								
Non-food	.73		-60.32	-66.32* c/	.65		-34.33	-50.97
Food	.27		60.32	66.32*	.35		34.33	50.97
Non-cereal	.23		43.24*	53.09*	.29		14.68	28.06
Cereal	.04		17.08	13.22*	.05		19.66	22.91

a/ The unit used is household for Pakistan and family for the Philippines.

b/ In the present study regression analysis was carried out on grouped means rather than on original individual observations. Therefore, the appropriate method of regression analysis is generalized least squares (GLS). This application of GLS to grouping of observation means that the observation of each grouped mean is weighted by the appropriate frequency in each income class. For further discussion see J. Johnston, Econometric Methods, 2nd edition, (New York, McGraw-Hill Book Co.1972), pp. 228-237.

All the equations estimated have good fits, with adjusted R^2 in the range of .94 and .98. These high values are to be expected when, as in the present case, data used are grouped means.

c/ With the exception of those parameters marked by asterisk, "*", all estimated parameters are statistically significant at the 5 per cent level. All of the insignificant parameters appear to be in equations estimated for urban areas of Philippines 1971 in which family size is sub-grouped by age structure with age under and above 18.

Income

The economic interpretation of these parameters is quite straightforward. The coefficients of the household budget variable may be thought of as marginal propensities to consume (MPC) with respect to a unit increase in the household budget. Thus a one dollar increase in total household expenditure in the urban areas of Pakistan is predicted to be associated with a 75 cent increase in non-food expenditure.

The effect of income, as proxied by total household budget, has been widely discussed in the literature. 8/ Our findings are consistent with generally accepted theory in that the MPC with regard to non-food items is consistently higher than the MPC with regard to food items. Likewise the MPC with regard to non-cereal foods is consistently higher than the MPC with regard to food expenditures.

Household size and age composition

Households vary considerably in size and age composition and these differences will affect patterns of consumption in two ways. Adding a person to the household reduces the spending capacity per person, given an unchanging budget 9/ while it raises total household requirements for goods and services.

The coefficients of household size represent a combination of two effects, which have been termed by Houthakker as the "specific" and "income" effects. 10/ The former refers to the increased requirements for various commodities due to an increase in household size. Because of "economies of scale in consumption" the increase in requirements is less than proportionate to the increase in household size. Since the coefficient refers to the influence of family size when total expenditure is given, an increase in family size reduces the level of total per capita expenditure.

8/ See FAO, Income Elasticities of Demand for Agricultural Products, (Rome, Food and Agriculture Organization of the United Nations, 1972).

9/ This analysis makes the assumption that total household expenditure is independent of household size.

10/ H.S. Houthakker, "An international comparison of household expenditure patterns, commemorating the centenary of Engel's Law", Econometrica, Vol. 25, 1957, p. 544.

This Houthakker refers to "metaphorically" as the income effect. Ideally it would be useful to isolate these two effects of increased family size but it is not possible within the framework of this linear model. Thus the total effect of an increase in family size must be viewed as the resultant of these two effects. If the specific effect is stronger than the income effect, the coefficient will be positive; if the income effect is stronger, the coefficient will be negative. Thus the coefficient for food is positive indicating that the specific effect is dominant whereas the coefficient for non-food is negative indicating that the income effect dominates. Since total expenditures are divided into these two groups and must remain constant regardless of household size, the absolute values of the coefficients are equal and they have the opposite sign. In practical terms this implies that an increase in family size may increase a household's need for non-food items (though less than proportionately due to economies of scale). However the increase in family size will also cause an increase in the demand for food items forcing the family to spend less on non-food items. That the effect of reduced per capita income is greater in the case of non-food items than food items is consistent with Engel's Law.

In other words as reported in Table 13.1, an increase in household size will result in an increased expenditure on food at the expense of expenditure on non-food items. This is consistent with Engel's Law which states that the proportion of total expenditures devoted to food items will increase as per capita expenditure decreases and, as noted above, an increase in household size will reduce food expenditure per capita. The results of the analysis also indicate that an increase in household size will have a greater effect on non-cereal than cereal expenditures.

Since people in different age groups have different needs, the age structure of households will also affect consumption patterns. 11/ For instance a child's food requirements are generally less than those of an adult. However, children require relatively more education and health services.

The data for the Philippines make it possible to disaggregate households according to age structure, thereby facilitating the estimation

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11/ A common method of taking age structure into account is to construct adult consumer "equivalent" scales, in which the consumption expenditure attributed to each household member is expressed as a proportion of a "standard" adult member.

of separate coefficients for the number of persons under and above the age of 18. Although many of the parameters are not statistically significant, the signs and most of relative magnitudes are consistent with a priori expectations. Specifically the addition to food expenditures is greater in the case of persons above the age of 18 than in the case of persons below that age. 12/ This reflects the greater food requirements of adults.

Urbanization

In many developing countries urbanization is proceeding at a rapid pace. This structural change in the composition of the population is likely to result in a shift from consumption patterns typical of rural subsistence economies to consumption patterns typical of urban market economies. This shift can be described by the difference in the parameters of the rural and urban consumption functions. That difference which can be interpreted as the effect of urbanization on consumption, may be due to such factors as advertising, quantity discounts and the availability of new products in urban areas.

The differences between the rural and urban parameters are consistent with Engel's Law. Given that urban budgets were about twice as large as rural budgets in the Philippines and 1.5 times larger than rural budgets in Pakistan, it was to be expected that the marginal propensity to consume food would be greater in rural areas than in urban areas. Table 13.1 confirms that this was the case in both countries.

Because total expenditure per household is greater in urban households, the coefficients of household size were absolutely greater in the former than the latter. That is to say the addition of a person to an urban household will tend to have a more pronounced effect on the pattern of consumption than the addition of a person to a rural household.

12/ This finding has been confirmed in numerous studies. J.Benus, J.Kmenta and H. Shapiro, "The dynamics of household budget allocation to food expenditures", The Review of Economics and Statistics, Volume LVIII, No. 2 (Mary 1976), pp.129-138. See Howard Howe, "Cross section application of linear expenditure systems - responses to socio-demographic effects", American Journal of Agricultural Economics, Vol.59, No.1 (Feb 1977), pp.141-148, Robert A. Pollak and Terence J. Wales, "Estimation of complete demand systems from household budget data: The linear and quadratic expenditure systems", American Economic Review, Vol.68, No. 3 (June 1978), pp. 348-359.

B. Decomposition of increments in total expenditure into economic and demographic effects

In this section of the study, a framework for integrating micro functions into macro economic analysis developed by Kelley [13] will be used to simulate the impact of a hypothetical set of changes in the economic and demographic characteristics of Pakistan and the Philippines for the purpose of generating an heuristic projection of their aggregate expenditures on food and non-food items. The purpose of this exercise is to calculate the proportions of the total change in consumption accounted for by changes in the economic and demographic variables respectively, and thereby demonstrate the significance of the latter.

Once projected, changes in the composition of consumption can be decomposed into four additive elements which are attributed to changes in :

a) the number of households

b) average household size

c) rural-urban location (migration)

d) per household expenditure

In the case of the Philippines the change in consumption is assumed to have occurred between the years 1971 and 1976. In the case of Pakistan the change in consumption is assumed to have occurred in the five year period 1971-72 to 1976-77.

In order to make the simulations, the regression coefficients derived from fitting the micro level consumption functions, described in the earlier section, were used in conjunction with assumed changes in the relevant economic and demographic variables. These are shown in Table 13.2. Though the assumed changes are purely hypothetical, they

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[13] See Allen C. Kelley, "Demand patterns, demographic change and economic growth", The Quarterly Journal of Economics, Vol. LXXXIII, No. 1 (February 1969), pp. 110-126.

Table 13.2. **Assumed changes in socio-economic and demographic variables, Pakistan** 1971/72 - 1976/77 and the Philippines, 1971-76.

Variable	Total change		Rate of annual change	
	Pakistan	Philippines	Pakistan	Philippines
Household size [a]				
Urban	.14		.5%	
Rural	.18		.6%	
Household size,[a] Age Under 18				
Urban		- 0.15		- .1%
Rural		0.045		.3%
Household size,[a] Age Above 18				
Urban		- 0.025		- .2%
Rural		.03		.2%
Number of households[a] (Thousands)	1,626	1,148	2.8%	3.2%
Rural-urban migrants (Thousands)	151	220	.4%	1.0%
			(of rural households)	
Household expenditure				
Urban	49	44	1.8	1.6%
Rural	33	86	1.8	1.6%
(dollars)				

[a] The unit used is household in the case of Pakistan and family in the case of the Philippines

were chosen so as to approximate the actual values of the variables in the two countries during the respective projection periods.

The projected increments in total consumption expenditure for Pakistan and the Philippines are shown in Table 13.3. It shows that incremental food consumption, measured in U.S. dollars of 1971 purchasing power, would have been $ 543 million and incremental non-food consumption would have been $ 571 million in the Philippines between 1971 and 1976. The total increase would therefore have been $ 1,113 million. In the case of Pakistan the increase in food consumption would have been $ 599 million and incremental non-food consumption would have been $ 723 million between 1971-72 and 1976-77. The total increase would therefore have been $ 1,322 million.

Table 13.3 also indicates the proportion of the total change in food, non-food and aggregate consumption respectively which can be attributed to each of the four elements on the assumption that the other three elements remain constant.

Thus if household size were to change without affecting the number or location of households or the level of expenditure per household, there would be no change in aggregate consumption expenditure; however there would be a marked shift from non-food to food consumption. Since the assumed changes in household size were much smaller in the case of the Philippines than in the case of Pakistan, the household size effect on consumption patterns was much less pronounced.

If the number of households were to change without affecting the size, location or average expenditure per household, then the projected increase in the number of households would have a major impact on the level of consumption and a most significant impact on the composition of consumption expenditures as well. In both Pakistan and the Philippines 62 per cent of the aggregate change in consumption expenditure was attributable to the projected increase in the number of households. Though it is the most important factor in the increase of both food and non-food expenditure,the number of households is more significant in the case of the former than the latter. This is largely due to the fact that the projected increase in per household incomes has a greater impact on incremental non-food consumption than food consumption, as would be expected from Engel's Law.

If the rural-urban proportion of households were to change as a result of internal migration without affecting the number and size of

Table 13.3. **Projected proportions of the increments of household consumption expenditure accounted for by economic and demographic factors. Pakistan 1971-1972 to 1976-1977 and the Philippines 1971-1976.**

(Percentage of the total increment)

Effects accounted for by	Incremental food consumption	Incremental non food consumption	Incremental total consumption
Pakistan			
Household size	8	- 7	0
Number of households	68	55	62
Rural-urban migration	1	3	2
Household expenditure	23	49	36
Total percentage	100	100	100
Total increment (million U.S.dollars)	543	571	1113
Philippines			
Household size a/			
Under 18	1	- 1	0
Above 18	1	0	0
Number of households a/	73	53	62
Rural-urban migration	7	10	9
Household expenditure	20	37	29
Total percentage	100	100	100
Total increment (million U.S.dollars)	599	723	1322

a/ The unit used is household for Pakistan and family for the Philippines.

households or the levels of per household expenditures in rural or urban areas respectively, then the projected rural-urban migration would result in increased aggregate expenditure in both Pakistan and the Philippines. The effect of migration is smaller in the former than the latter due to the fact that the proportion of rural households assumed to migrate to urban areas annually is .4 per cent in the case of Pakistan and 1.0 per cent in the case of the Philippines.

This methodology involves the implicit assumption that rural-urban migration will raise total national expenditure as rural households adopt urban expenditure patterns immediately upon arrival in urban areas. Consistent with Engel's Law, this rural-urban shift would result in a shift in the composition of consumption in the direction of non-food expenditures.

When all three demographic factors are taken together, they account for 64 per cent of the increase in aggregate consumption in the case of Pakistan and 71 per cent of the change in aggregate consumption expenditures in the Philippines. The remainder would be attributed to the effect of increases in the average level of household expenditure in rural and urban areas respectively. The contribution of this factor to the total increase in expenditure was 36 per cent in the case of Pakistan and 29 per cent in the case of the Philippines. This reflects the fact that the assumed annual rate of growth of expenditure per household in Pakistan was 1.8 per cent as opposed to 1.6 per cent in the case of the Philippines.

C. Changes in patterns of consumption

Table 13.4 illustrates the effect of the hypothesized changes on the pattern of consumption over the projection period for both Pakistan and the Philippines.

As would be expected the proportion going to food expenditures declined slightly in both the rural and urban areas of both countries. This is due to the fact that in each of these areas, non-food expenditures were growing at almost twice the rate of food expenditures.

D. Concluding remarks

A major purpose of this study has been to demonstrate the relative importance of demographic effects on the composition of consumption

Table 13.4. Percentage distribution of incremental and total consumption expenditure per household over a 5-year period, Pakistan 1971-72 to 1976-77 and the Philippines 1971-1976.

(Percentage)

	Pakistan,						The Philippines,					
	Urban			Rural			Urban			Rural		
	Total	Food	Non-food	Total	Food	Non-food	Total	Food	Non-food	Total	Food	Non-food
Percentage distribution of increment per household expenditure a/	100	33	67	100	45	55	100	24	76	100	42	58
Percentage distribution of total food and non-food expenditure per household a/												
Base period	100	49	51	100	58	42	100	47	53	100	59	41
Projected period	100	48	52	100	57	43	100	45	55	100	58	42
Annual compound growth rate (per cent)	1.8	1.2	2.3	1.8	1.4	2.3	1.6	.8	2.3	1.6	1.1	2.2

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a/ The unit used is household in the case of Pakistan and family in the case of the Philippines.

expenditures, disaggregated by commodity. On the basis of plausible scenarios of economic and demographic trends in two developing countries it would appear that both economic variables, such as household budget, and demographic variables, such as household size and its age structure, play a significant role in determining consumption behaviour.

Using a macro-economic framework, the simulation model based on a plausible set of assumptions generated results which are in conformity with Engel's Law in that a larger share of incremental expenditure per household is devoted to non-food than to food items. However, Engel's Law does not provide a complete explanation for the shift of consumption patterns away from food expenditure. Population growth and associated changes in household size, age structure and location also affect both levels and patterns of expenditure. It was found that changes in the demographic variables considered in this study accounted for a greater proportion of the incremental change in consumption than was accounted for by the change in total expenditure per household.

In assessing the significance of these results it must be recalled that it is a partial analysis which does not specify all of the socio-economic factors which might affect consumption, such as rural-urban price differentials.

Needless to say, the validity of the results are dependent on the accuracy of the basic data and the validity of the underlying assumptions. Among the stronger assumptions of this study was the linearity of behavioural relationships.

Finally it should be noted that though changes in total expenditures per household were associated with less than 40 per cent of the increment in total consumption expenditure, it does not necessarily follow from this that demographic variables are more important than economic variables in determining levels and patterns of household consumption. This decomposition is based on the assumption that household size, the number of households, their geographic location and expenditure per household can be treated as independent factors. In reality, they are mutually interacting factors. As couples marry and leave home, the number of households may increase but average household size may decline. New households may earn less than established households so that an increase in the number of households may reduce total expenditure per household. If there is a substantial differential between the per household expenditure levels of rural and urban areas, migration may change the level of expenditure per household in each area. In order to form a complete view of the consequences of demographic change on consumption, these interrelationships between the economic and demographic determinants would also have to be assessed.

Though further research is required to identify the mechanisms and behavioural changes involved in consumption behaviour, this study has demonstrated that population factors are important in explaining shifts in the composition of consumption expenditures. For this reason greater weight should be given to demographic factors in planning the future structure of industry.

Chapter 14

SOME DEMOGRAPHIC CHARACTERISTICS OF WOMEN'S WORK IN TEN WORLD FERTILITY SURVEY COUNTRIES

Introduction

Data from the World Fertility Surveys provide a new opportunity to examine patterns and demographic characteristics of women's work in selected countries of the developing world. The WFS Core Questionnaire includes a set of questions on the extent and type of women's work which are linked to the event of first marriage. Because of WFS's central focus on fertility, the sample was typically restricted to ever-married women. In addition, women were specifically asked about their work activities apart from housework, so unemployment was not distinguished from non-working status. For these two reasons, this sample definition prohibits strict comparison of these WFS labour data with census data published by the ILO on labour force participation and occupational distribution. Unfortunately, despite a uniform definition of work supplied by the WFS, 1/ some countries seem to have differed in their interpretation and application of the definition within their own questionnaires. Although the application of the WFS recommended definition of work is likely to have improved the comparability of data for some countries relative to previous census data, a diversity of definitions still remains ranging from Bangladesh where only work for cash was investigated and Pakistan where farm work was not included to Thailand where all unpaid farm workers were included.

Despite this lack of comparability between certain countries in overall levels of work, there is much that can be compared, such as patterns of work by age, marital status and age of youngest child within countries as well as fertility differentials by the nature and extent of past work. This report presents only a few very preliminary findings for 10 WFS countries, 3 from Latin America and 7 from Asia. 2/ The choice of the countries for inclusion was dictated by the availability of a reasonably clean Standard Recode Tape. 3/

1/ The wording of the current work status question on the core questionnaire is as follows: "As you know, many women work - I mean aside from doing their own housework. Some take jobs for which they are paid in cash or kind. Others sell things, or have a small business, or work on a family farm. Are you doing any such work at the present time?"

2/ Colombia, Panama, Peru, Pakistan, Bangladesh, Indonesia, Sri Lanka, Thailand, Korea and Jordan.

3/ Problems with labour force variables for Guyana and Jamaica precluded their use at this time.

Overall Patterns of Labour Force Participation

Table 14.1 presents some summary statistics on the nature and extent of work among women in these 10 countries. The sample here is defined as ever-married women aged 15-49 at the time of the survey. All the figures in the table are age-standardized because women's work rates are known to vary widely with age. 4/

The range of work rates shown in table 14.1 is typical of labour force data from the developing world. The work rate is defined here as the percentage of women who were classified as working at the time the sample was conducted. 5/ The rates range from a low of 9.8 per cent in Jordan to a high of 82.0 per cent in Thailand. This wide range has much more to do with differences in definitions than to differences in the extent of women's actual work. Unfortunately, given different cultural views of women's role, WFS was not able to standardize the treatment of unpaid family work despite the uniform definition of work quoted on individual country questionnaires.

Despite these definitional differences, however, the WFS data gives some information on pattern of work pre- and post-marriage which can be compared. The Index of Instability in table 14.1 is designed to show the degree of turnover in the defined labour force since marriage. It is defined as the number of women who have worked since marriage divided by the number of women working at the time of the survey. If the index equals one, this means that all the women in the sample who had worked since marriage were working at the time of the interview. If the index is greater than one, this means that some women who had worked since marriage were not working then. The smaller the work rate at the time of the survey, the higher this index can potentially be. The numbers in parentheses show the actual percentage of women who worked since marriage. The Index of Discontinuity is defined in a similar fashion as the number of women who had ever worked divided by the number of women who worked since marriage. It is designed to show the degree of discontinuity in work created by the event of first marriage. The numbers in parentheses here show the percentage of women in the sample who had ever worked.

4/ The age distribution of Colombia's ever-married sample was chosen as a standard mainly because it had a relatively typical mean age at marriage and did not show unusual extremes in the proportion of the sample aged 15-19 (which is an age-group whose work rate differs substantially from the average). This is clearly an arbitrary decision, but in few cases did it make any perceptable difference in the calculated rates or in between-country differences.

5/ The classification of women's current work status is somewhat ambiguous, however, because it is unclear whether the question about whether the woman is "working at the present time" could mean today, this week, this month or this year. In most countries the phrasing of this question was left somewhat vague, so there was room for individual differences in interpretation.

Table 14.1 Age-standardized [a/] work rates for ever-married women aged 15-49 in ten WFS countries

	Asia							Latin America		
	Bangladesh 1975	Indonesia 1976	Jordan 1976	Korea[b/] 1974	Pakistan 1975	Sri Lanka 1975	Thailand 1975	Colombia 1976	Panama[c/] 1976	Peru 1977
Extent of work										
	OVERALL WORK RATE									
1. Percent of ever-married women working at time of survey	13.9	66.0	9.8	45.7	17.4	35.0	82.0	25.9	33.1	48.9
	INDEX OF INSTABILITY									
2. Ratio of women working post marriage to women working at time of survey	1.11	1.06	1.45	1.24	1.11	1.17	1.10	1.68	1.61	1.26
(Percent of women working post marriage)	(15.4)	(69.6)	(14.2)	(56.6)	(19.4)	(40.8)	(90.2)	(43.6)	(53.2)	(61.5)
	INDEX OF DISCONTINUITY									
3. Ratio of ever-worked women to women working post marriage	1.05	1.08	1.69	1.37	1.12	1.27	1.07	1.54	1.44	1.35
(Percent of women who ever-worked)	(16.0)	(74.9)	(23.5)	(77.7)	(21.6)	(51.1)	(96.7)	(67.2)	(76.0)	(81.9)
Type of work [d/]										
	NON-AGRICULTURAL WORK RATE									
1. Percent of all ever-married women working in non-agriculture	13.9	25.2	8.8	25.8	14.1	14.3	24.2	39.1	51.3	39.3
(GNP per capita) [e/]	(90)	(300)	(710)	(810)	(190)	(200)	(410)	(710)	(1220)	(830)

	Asia							Latin America		
	Bangladesh 1975	Indonesia 1976	Jordan 1976	Korea b/ 1974	Pakistan 1975	Sri Lanka 1975	Thailand 1975	Colombia 1976	Panama c/ 1976	Peru 1977
	AWAY FROM HOME WORK RATE									
2. Percent of all ever-married women working away from home	10.3	33.8	6.7	17.6	9.2	26.2	25.0	30.4	46.4	26.6
	NON-FAMILY EMPLOYEES									
3. Percent of all ever-married women working for other employers	11.1	25.4	6.0	11.9	7.8	26.7	19.3	28.1	45.4	18.5

---

a/ Standard age distribution was the sample distribution for Colombia

b/ Women aged 16-49

c/ Women aged 20-49

d/ All these rates are based on work type post marriage

e/ Data from World Bank, World Bank Atlas. Population, Per Capita Product and Growth Rates, 1978. The figures are in dollars and are for 1977.

An examination of this data in table 14.1 shows certain systematic differences between countries with a clear regional pattern for the three Latin American countries. The relatively high instability ratios shown for Colombia, Panama and Peru mean that women reported as working at any moment in time are not that different from many other women in terms of work experience whereas in certain Asian countries women working at the time of the survey have systematically different work habits from other married women. In other words, in Latin America there was much greater flexibility in the timing of work whereas, in most Asian countries described here, there was little flexibility either because most women were reported as working all of the time, as in Thailand, or because working women are a small and unusual group, as in Pakistan and Bangladesh.

A similar pattern appears in the Discontinuity Index. The three Latin American countries and Jordan all show a significant drop in work rates with marriage whereas, in most Asian countries, most women who worked before marriage also work after marriage. However, in Pakistan and Bangladesh, the reason for this pattern is that few women work before marriage partly because of the low age of marriage and partly because of cultural and religious prescriptions against women's work. In the other Asian countries, substantial percentages of women in the sample were recorded as working before marriage, ranging from 40.0 per cent in Sri Lanka to 91.3 per cent in Thailand.

Three patterns of women's work emerge from this table. The first is displayed in the Latin American countries where a substantial per cent of women had worked at some time, and the timing of work is flexible. The second is displayed by the Moslem countries of Bangladesh, Pakistan and Jordan where relatively few women are recorded as working under any circumstances. However, in Jordan there appears to be more flexibility in the timing of work for the relatively few women who work whereas in Bangladesh and Pakistan, working women, who are few in number, appear to work consistently and are therefore likely to be quite unusual in many respects relative to the average women. In the rest of the Asian countries represented, work experience is reasonably high and there is less flexibility, although Korea and Sri Lanka appear to represent a somewhat intermediate group.

In the second part of table 14.1, three indicators of type of work are presented: (1) the percentage of all ever-married women who had been employed in non-agricultural occupations at some time after marriage, (2) the percentage of all ever-married women who had worked away from home at some time since first marriage, and (3) the percentage of all ever-married women who had been employees of a non-family enterprise since first marriage. These statistics are based on all women rather than only on working women because of the substantial variation in women's work rates across countries.

Although there is a significant range of values displayed for each of these three indicators, the variation among countries is substantially less than that displayed by the overall work rates. A major reason for this is that unpaid family labour, which is treated differently from one country to the next, has been largely eliminated from each of these indicators. The variation remaining should be a much better reflection of actual inter-country differences in work patterns.

The percentage of married women working in non-agriculture can be seen to vary systematically with level of development. The figures in parentheses represent gross national product per capita in dollars for 1977. In general, women's participation in non-agricultural occupations appears closely linked with level of per capita GNP. The two notable exceptions are Jordan where participation is low despite relatively high GNP per capita and Indonesia where roughly a quarter of married women had worked in non-agriculture despite a relatively low GNP per capita.

The reasons lying behind variations in the other two indicators of type of work are less obvious. More than a quarter of all ever-married women had worked away from home in Colombia, Panama, Peru, Indonesia, Sri Lanka and Thailand. Among the other four countries, the Moslem countries of Bangladesh, Pakistan and Jordan show substantially smaller percentages, which can be at least partially explained by the traditional seclusion of women in the home. In only four countries (Colombia, Panama, Indonesia and Sri Lanka) more than a quarter of ever-married women worked as a non-family employee. The pattern of women's employment in Panama is quite strikingly different from the rest and is likely to be largely due to the industrial composition of production in that economy.

Work Patterns by Age, Age of Youngest Child and Marital Status

Patterns of women's work with age are often seen to reflect the impact of marriage and child-bearing. The double-peaked age-labour force participation profile so typical in many developed countries is a reflection of the impact of child-bearing on women's labour force participation within a relatively narrow interval and the high rates of participation of younger women. In general, age-participation profiles for the developing countries are much flatter than those for the developed countries partly because of the relatively long period over which child-bearing takes place. 6/

6/ Guy Standing, Labour Force Participation and Development (ILO, Geneva, 1978).

In addition, developing countries with very early marriage age show a gently upwardly sloping profile from the age group (15-19) whereas countries with later mean marriage ages show a relative peak of participation in the 20-24 year old group. 7/

Figure 14.1 shows age-work profiles for the 10 WFS countries included in this analysis. These work profiles are particularly startling at first because their continuously upward slopes appear to conflict with previous findings. However, it must be remembered that this sample consists exclusively of ever-married women and, therefore, provides quite different figures than the census data on participation of all women usually used to derive these profiles. One would expect that 15-19 year old women who are already married would have relatively low work rates because, in developing countries, child-bearing typically begins shortly after marriage. Fertility control is more typically used, if at all, to limit family size than to affect the timing of first birth and subsequent spacing. Therefore, the sharply sloped profile in the early years for most countries may reflect the easing of work-fertility conflicts with the aging of first born children who can take on certain child care responsibilities. The relative peaks of work participation displayed for many countries at ages 35-39 may reflect the completion of child-bearing. It should be noted that the three Moslem countries,(Pakistan, Bangladesh and Jordan) have low flat profiles indicating that few women work regardless of age or child-bearing patterns. 8/

However, one must be cautious in the interpretation of these profiles because little is known about trends in work rates in these countries. If trends have been relatively stable, it is a reasonable approximation to interprete these profiles in a life-cycle context, but it must be remembered that these profiles are constructed on the basis of age-specific work rates for different cohorts of women. In countries where fertility has been declining and/or economic development has been progressing, these profiles will not be representative of the experience of any individual cohort of women, if these changes have brought in their stead changes in the levels of work.

7/ This was based on an analysis of mid-1975 ILO estimates of female labour force participation rates by age for these 10 countries. International Labour Office, Yearbook of Labour Statistics, 1978, Geneva, 1978, Special Table, pp. 15-47.

8/ These three profiles resemble the usual ILO profiles more closely because the large majority of women 15-19 are ever-married in these countries. The level of work in Bangladesh shown in table 14.1 is too low because of the exclusion of in kind work. It should be noted that while Indonesia has a large Moslem population, adherence is less evident in Java and Bali where the survey was conducted.

Table 14.2 shows overall changes in labour force participation rates between 1950 and 1975 for the 10 countries discussed here taken from ILO estimates and projections. Six of the ten countries show relatively little change in labour force participation rates over time and, in these cases, figure 14.1 should provide a reasonably accurate approximation of the labour force participation of women over the life cycle. In Pakistan, Jordan and Bangladesh, work is relatively uncommon at all ages and, therefore, the profiles are flat whereas in Indonesia, Peru and Sri Lanka, participation rates clearly increase with age. In Colombia, Panama and Korea, labour force participation rates have increased dramatically since 1960. This suggests in the case of Korea, a profile even more steeply sloped than that depicted and in the cases of Panama and Colombia, a profile with a more continuous upward slope. On the other hand, in Thailand, labour force participation rates have declined. 9/ In this case it is likely that the actual life-cycle profile is relatively flat because of the overwhelming importance of unpaid family labour. It is possible that if such work had been excluded, Thailand would have appeared more similar to the other countries.

It has been suggested that the upward-sloping work profile may be explained by the easing of work-fertility conflicts as children age. In particular in countries where large families are the norm, a crucial aspect of fertility determining work patterns may be the age of the youngest child, rather than the size of the family, because of the importance of older children in the rearing of younger children once they are no longer physically dependent on their mother. Table 14.3 shows differences in work rates between women according to the age of their youngest child, controlling for age. 10/ In every country but Pakistan, Jordan and Thailand, the age of the youngest child was found to be a significant factor (based on an analysis of variance) explaining variations among women in work rates. It should be noted that women with no children were included as a separate category and found to have the highest work rates in 6 out of 10 countries. In the other four countries, women with their youngest child over the age of four had the highest work rate, suggesting that, in certain cases, the presence of children may be an inducement to work. The lowest work rates were typically found for women who had a child under a year of age. In general, work rates can be seen to increase with the age of the youngest child, but only in Colombia, Panama, Bangladesh, Indonesia and Sri Lanka can notable differences in work rates be seen between women whose youngest child is less than one and those whose youngest child is older than four.

9/ This is probably due to declines in the relative importance of unpaid family work as the economy develops.

10/ This is important because the length of the open interval will be very dependent on the age of the women and therefore, the age distribution within each of these groups is expected to differ.

Table 14.2 Age-standardized female labour force participation rates for ten WFS countries a/

	1950	1955	1960	1965	1970	1975
Asia						
Bangladesh	17.4	17.9	18.5	19.1	19.7	20.1
Indonesia	31.1	31.0	30.8	32.8	34.8	33.9
Jordan	4.5	4.6	4.8	5.1	5.4	5.8
Korea	27.8	28.6	29.4	35.2	40.9	40.7
Pakistan	9.2	9.3	9.5	9.6	9.7	10.3
Sri Lanka	28.2	28.9	29.5	30.2	30.8	30.4
Thailand	83.9	86.7	85.9	84.1	78.3	76.4
Latin America						
Colombia	20.9	21.1	21.3	24.6	27.9	27.7
Panama	24.8	25.8	26.9	30.6	34.3	33.7
Peru	23.3	23.3	23.3	22.6	21.9	23.3

a/ The labour force participation rate is defined as the female labour force aged 15-54 divided by the female participation of the same age, standardized using the 1960 distribution of female population in Colombia 15-54.

Source:. I.L.O., Labour Force Estimates and Projections, 1950-2000, Second Edition, Geneva, 1977, Vols. I and III.

Table 14.3 Work rates for ever-married women aged 15-49 years by age of youngest living child, for ten WFS countries [a]

	No child	Youngest child < 1	Youngest child 1-2	Youngest child 2-4	Youngest child 4+
Asia					
Bangladesh, 1975	.13	.07	.08	.11	.17
Indonesia, 1976	.77	.54	.57	.61	.71
Jordan, 1977 [b]	.10	.10	.09	.10	.12
Korea, 1974	.53	.50	.53	.53	.44
Pakistan, 1975	.20	.15	.15	.19	.17
Sri Lanka, 1975	.41	.30	.36	.36	.37
Thailand, 1975 [b]	.86	.79	.83	.81	.83
Latin America					
Colombia, 1976	.30	.18	.25	.25	.32
Panama, 1976	.39	.21	.29	.29	.42
Peru, 1977	.59	.46	.51	.51	.52

Notes:

[a] Work rates have been controlled for age using multiple classification analysis.

[b] The differences between columns in work rates were not statistically significant.

A comparison of figure 14.1 and table 14.3 suggests that the aging of youngest children is at least a partial explanation for the age-work profiles, with patterns in some countries more strongly linked to this hypothesis than others. 11/ Countries whose life cycle work profiles are likely to slope up continuously until age 39 include Bangladesh, Indonesia, Korea, Sri Lanka, Colombia, Panama and Peru. Of this group, Colombia, Panama, Peru, Bangladesh, Indonesia and Sri Lanka appear to have work patterns consistent with this hypothesis. With the exception of Bangladesh, these are also countries where work-fertility conflicts should be particularly acute because of relatively high percentages of women working away from home and for non-family employers (table 14.1). Work profiles in Korea remain somewhat puzzling. There, work rates of women whose youngest child is less than three years of age are relatively high but are significantly less for women whose youngest child is over four. The small differences among women of different ages in work rates for Pakistan and Jordan are consistent with their flatter profiles and their relatively low participation in non-family work.

The relatively high work rates for women who have never borne a child might suggest that the age-work profiles should fall from the time of first marriage to the time of first pregnancy. The rising profiles in chart I strongly suggest that, for the large majority of women, child-bearing must follow relatively immediately upon marriage. Otherwise, these profiles would appear flatter or even downward sloping at first.

Another possible additional explanation for the upward-sloping profile in some countries is the increasing probability of marital disruption (from death or separation) with age. Labour force participation is strongly affected by marital status because married women at most share financial responsiblity for the household whereas widowed, separated and divorced women often bear sole responsibility for supporting the family. Table 14.4 shows differences in work rates by marital status group, when the age distribution is controlled. 12/ This is the women's marital status at the time of the survey. It is immediately apparent that married women (defined to include those united by common law in Panama and Colombia) have significantly lower recorded work rates than those who were widowed, separated or divorced at the time of the survey. There is no systematic pattern among these marital status groups in terms of the relative level of recorded work. 13/ This may depend very much on differences among countries in family law and custom.

11/ A fuller test of this hypothesis would require looking at age of oldest child, family size and length of open interval simultaneously.

12/ This is important because the probability of marital disruption increase with age and therefore the age distribution of widows, and those separated and divorced does not ressemble the age distribution of currently married women.

13/ In another comparison not shown here, ever-married women were divided into three groups: currently married and married only once, currently married but married more than once and not currently married. The work rates of currently married women married once or more than once were not notably different, but the women not currently married had strikingly higher work rates. It appears that current status is more important in determining work rates than past marital disruption.

Figure 14.1
Current work rates for ever-married woman aged 15–49 years by age

10 World Fertility Survey Countries

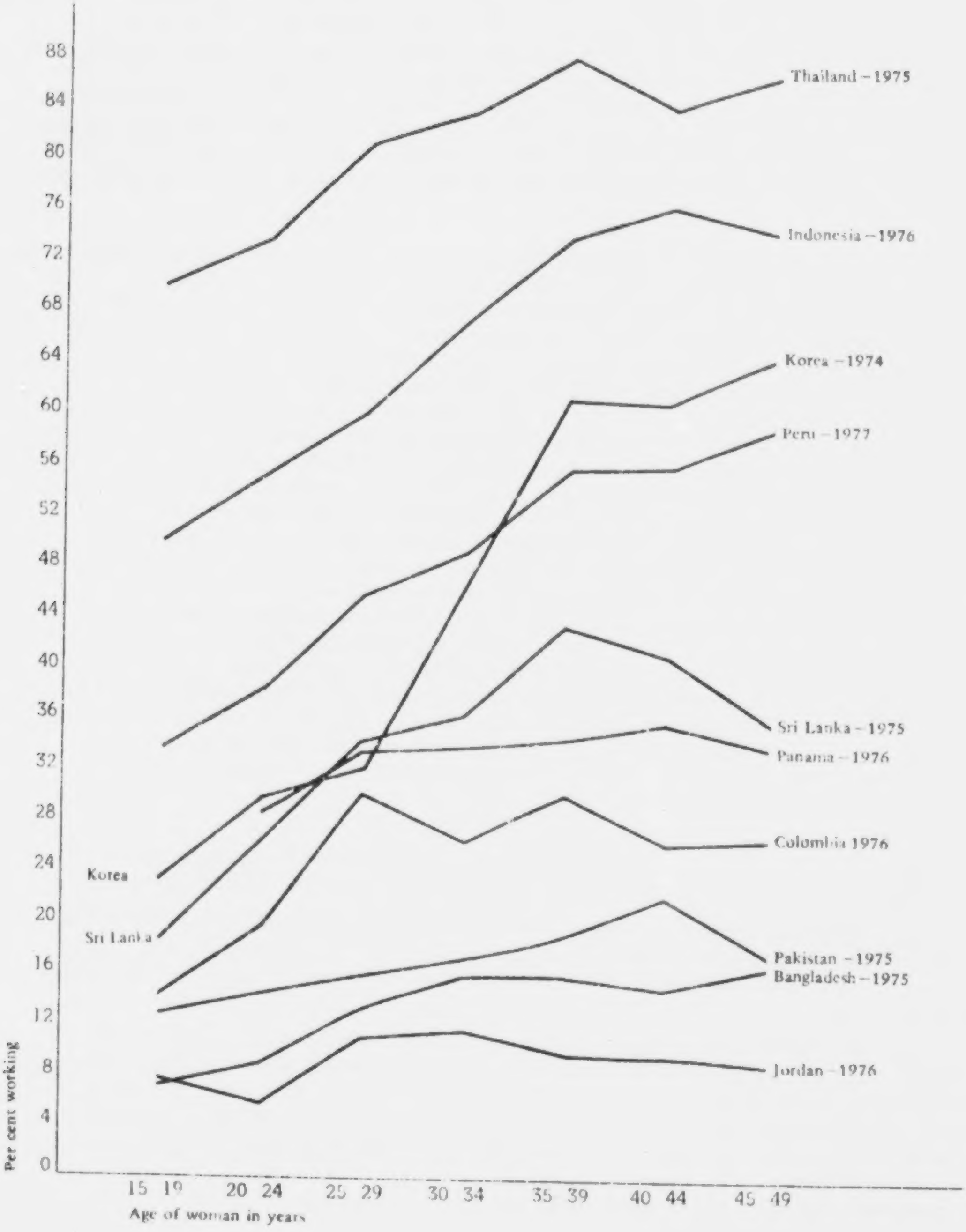


Table 14.4 Work rates for ever-married women aged 15-49 years by marital status for ten WFS countries a/

	Married	Common Law b/	Widow	Separated	Divored
Asia					
Bangladesh, 1975	.10		.37	.42	.28
Indonesia, 1976	.64		.82	.78	.81
Jordan, 1977	.10		.17	.42	.19
Korea, 1974	.48		.61	.59	.74
Pakistan, 1975	.16		.32	.24	.28
Sri Lanka, 1975	.34		.51	.55	.48
Thailand, 1975	.82		.85	.83	.88
Latin America					
Colombia, 1976	.21	.23	.45	.54	c/
Panama, 1976	.36	.22	.49	.77	.53
Peru, 1977	.48		.73	.71	.65

Notes: a/ Work rates have been controlled for age using multiple classification analysis.

b/ This category was only broken out separately for Colombia and Panama.

c/ Not available.

The importance of this phenomenon for the age-work profiles is very much dependent on the prevalence of marital disruption, the remarriage rate and the timing of these events. Figure 14.2 shows the percentage of ever-married women not currently married by age for each of the 10 countries. In most cases, the percentage of unmarried women does not rise steeply until after the age of 39 and until then, the unmarried group never exceeds 16 per cent of the total sample. Although obviously a factor affecting work patterns as previously shown, marital status does not appear to be a primary explanation of the shape of the age-work profile which shows its most dramatic increases between the ages of 25-29 and 35-39 for most of those countries with upward sloping profiles. Thus, the explanation is more likely to be found in women's child-bearing patterns discussed above and in the trends and structure of employment opportunities for women.

Although the above discussion makes clear that such factors as age, marital status and age of youngest child contribute to an explanation of women's work patterns, it is also apparent that other factors are important as well. Because the relationship between work and fertility depends crucially on the type of work women do, it is clear that inter-country differences in work patterns may have a lot to do with the structure of employment and the stage of development. In the next section, this hypothesis will be explored more closely by examining the relationship between different characteristics of women's work and average children ever born.

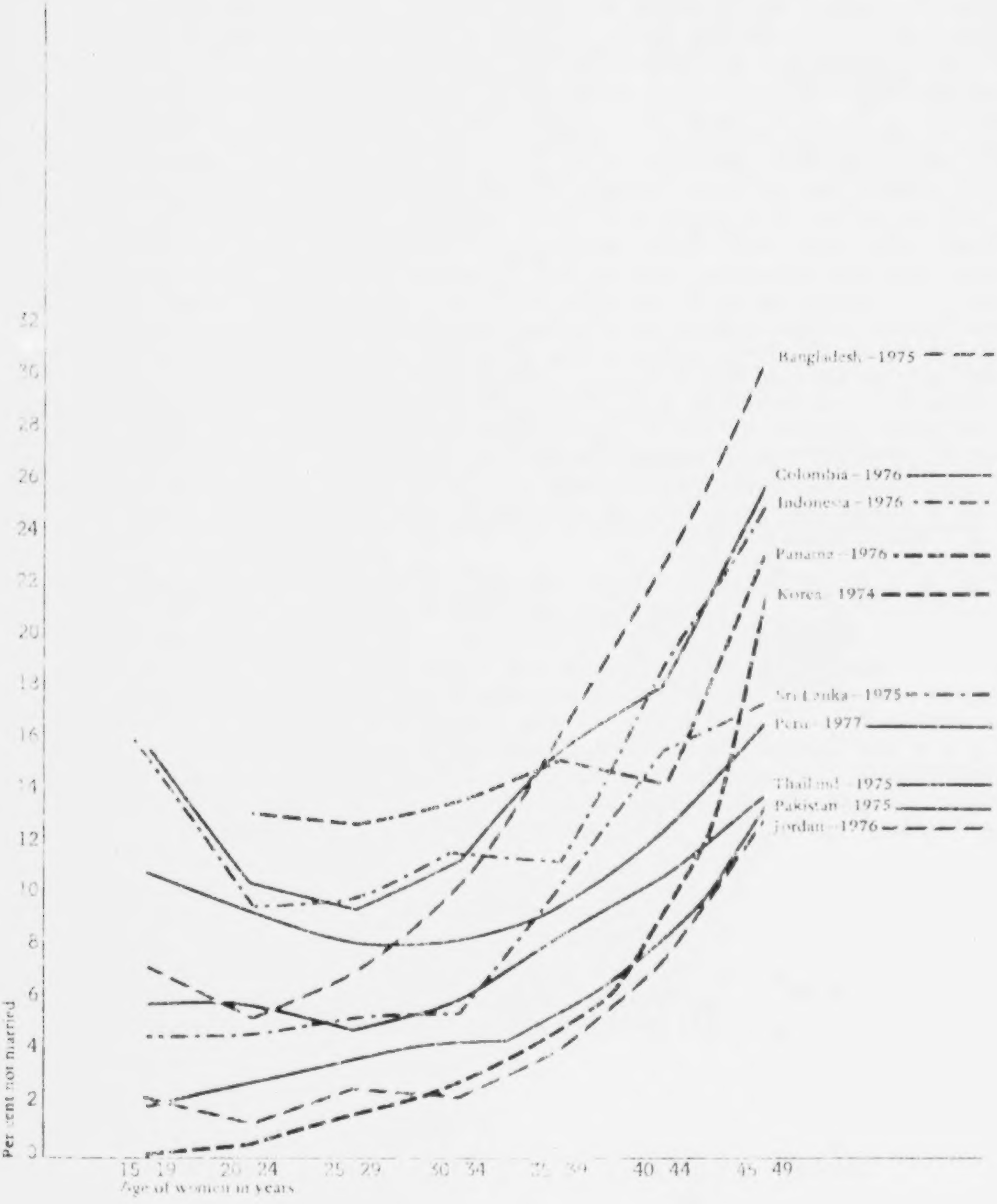
Mean Children Ever Born by Type of Work

The opportunity structure for women's work depends on the level of economic development, the composition of production and various cultural factors affecting the level of discrimination against women's work (or alternatively the relative acceptance of women's work in different economic sectors). Such macro-level variables are not available in the WFS data, but some hint as to the importance of these factors in explaining women's work patterns and rates can be seen by looking at differentials in mean children ever born by the nature of women's work. In these preliminary explorations, the sample was further restricted to continuously married women (i.e. currently married women married only once) so as to eliminate the compounding effect of marital status on the relationship between work rates and children ever born. 14/ By looking only at continuously married women, there is confidence that work and fertility experience have coexisted within the context of an unbroken marriage.

14/ Not only are work rates significantly higher than the average for non-married women but mean children ever born are significantly lower than the average for this group. Because of space limitations, these data are not shown here. Therefore in a sample of all ever-married women fewer children ever born for women with high work rates could be purely a reflection of the fact that these women are less likely to be currently married.

Figure 14.2
Per cent of the ever-married sample not currently married by age

10 World Fertility Survey Countries



The three dimensions of work type available on the WFS standard recode tapes are occupation, work status and place of work. Tables 14.5 to 14.7 present differences in mean number of children ever born by each of these work characteristics, with marital duration controlled. 15/ In each case the comparison includes the no work category as a contrasting "type of work". Obviously, since nearly all women work the world over, it is important to regard the "no work" category as representative of another kind of work - work confined to the household sector. This work is also economically productive but unmeasured and forms the residual in all calculated work rates.

It is hypothesized that work in the non-agricultural sector, work taking place away from home and work as a non-family employee would involve the most difficulty for women engaged in child-bearing and rearing. Therefore one would expect to find women with fewer children in these occupations. On the other hand, farm work, work taking place at home and family or self-employed work are much more flexible and do not involve to the same extent the physical separation of mothers and children. These types of work should be much better suited to mothers with many children. Household work ("no work"), although the least incompatible with respect to child-bearing and rearing is also the least financially renumerative way for women to spend their time in terms of their acquiring purchasing power over market goods and services. Therefore, it is unclear whether one should expect women's cumulative fertility to be highest in this group, or in the more traditional work category of agricultural, home and family work. A large family may increase a woman's need to work for pay and be most likely to encourage work in a traditional context.

In the case of all three types of work measures, variation in type of work is a significant factor explaining variations among women in mean children ever born (using analysis of variance test) in every country investigated except Pakistan. This is not surprising given that in Pakistan only agricultural workers defined as non-family employees were included in the work category. In the case of the non-agricultural-agricultural distinction displayed in table 14.5, seven out of the ten countries are characterized by the expected pattern, with cumulative fertility highest for women in agricultural occupations, next highest for women in the "no work" category, and lowest in the non-agricultural occupations.

15/ Obviously marital duration is the principal determinant of cumulative fertility and therefore, any differences between work groups in the distribution of years since marriage, will strongly affect the averages being compared.

Table 14.5 Children ever born by occupation for continuously married women

Country	Agriculture	Non-Agriculture	No Work
Asia			
Bangladesh, 1975	3.49	3.80	4.01
Indonesia, 1976	3.33	3.57	3.97
Jordan, 1976	5.73	4.84	5.41
Korea, 1976	4.10	3.19	3.39
Pakistan, 1975 b/	4.19	4.26	4.18
Sri Lanka, 1975	4.00	3.68	3.95
Thailand, 1975	4.08	3.44	3.72
Latin America			
Colombia, 1976	5.06	3.69	4.35
Panama, 1976	4.71	3.34	4.11
Peru, 1977	4.86	4.17	4.51

Notes:

a/ Controlled for marital duration using multiple classification analysis.

b/ f-ratio not significant in a two way analysis of variance with children ever born and place of work.

Table 14.6 Children ever born by place of work for continuously married women for ten WFS countries a/

Country	Work away	Work at home	No work
Asia			
Bangladesh, 1975	3.85	3.71	4.01
Indonesia, 1976	3.58	3.28	3.97
Jordan, 1976	4.92	5.44	5.41
Korea, 1974	3.23	3.86	3.40
Pakistan, 1975 b/	4.24	4.23	4.18
Sri Lanka, 1975	3.66	4.29	3.95
Thailand, 1975	3.62	4.01	3.71
Latin America			
Colombia, 1976	3.72	4.12	4.35
Panama, 1976	3.30	3.90	4.13
Peru, 1977	4.17	4.62	4.52

Notes:

a/ Controlled for marital duration using multiple classification analysis.

b/ f-ratio not significant in a two-way analysis of variance with children ever born and place of work.

Table 14.7 Children ever born by work status for continuously married women for ten WFS countries

Country	Non-family employee	Self-employed	Family worker	No work
Asia				
Bangladesh, 1975	3.90	3.87	3.06	4.01
Indonesia, 1976	3.62	3.49	3.23	3.97
Jordan, 1976	4.83	c/	5.42	5.41
Korea, 1974	3.22	3.31	3.97	3.40
Pakistan, 1975 b/	4.15	4.26	d/	4.17
Sri Lanka, 1975	3.64	3.95	4.46	3.95
Thailand, 1975	3.65	3.45	4.09	3.72
Latin America				
Colombia, 1976	3.69	3.90	4.31	4.35
Panama, 1976	3.32	3.52	4.32	4.11
Peru, 1976	3.95	4.48	4.77	4.51

Notes:

a/ Controlled for marital duration using multiple classification analysis.

b/ f-ratio not significant in a two-way analysis of variance with children ever born and work status.

c/ This category not separately broken out after marriage.

d/ This category of work was excluded in Pakistan. It is presumed these women were included in no work.

This pattern is reversed in the case of Bangladesh and Indonesia where agricultural occupations appear to have the lowest fertility. Obviously further research must be conducted before these divergent patterns can be fully understood. 16/

In table 14.6 differences in cumulative fertility by place of work are presented. Again Bangladesh and Indonesia are exceptions to the typical pattern which is that women working away from home have the lowest fertility. The relatively ranking of work at home and "no work" show no systematic pattern but this is not surprising because in fact both groups work at home. Again in table 14.7, which shows cumulative fertility differentials by work status, Indonesia and Bangladesh provide exceptions to the typical pattern which is that fertility is lowest among non-family employees. Thailand is also an exception in this case where the lowest fertility is found in the self-employed group. The relative rank among the rest of the work status groups does not show any consistent pattern.

Although certain patterns emerge from this preliminary investigation, it is apparent that many inter-country differences remain to be explained. It can be said, however, in terms of regional patterns that the Latin American countries appear more homogeneous among themselves with respect to women's work patterns. At this point, these findings are only suggestive of some of the important dimensions of the work-fertility relationship. The major conclusion that can be drawn thus far is that women's work patterns have something to do with child-bearing patterns as well as the distribution of employment for women in terms of occupation, industry and location of work.

16/ In fact, Indonesia and Bangladesh are a puzzling contrast because, whereas in Indonesia a large part of the agricultural work force is unpaid, in Bangladesh only cash work was counted and this group is relatively small.

Chapter 15 *

POTENTIAL POPULATION SUPPORTING CAPACITIES OF LANDS: AFRICA

Man's demands for food, from the natural resources that sustain his existence, have increased enormously in recent years. Despite major advances in agricultural technology, hunger continues to spread and now affects at least 500 million people. Projections reveal that almost 50 per cent more food will have to be grown in the year 2000 to meet present inadequate nutritional levels; yet additional supplies will be needed to conquer famine and malnutrition.1/

The ability of land to produce food is however limited. The limits of production are set by soil and climatic conditions and the use and management applied. Any "mining" of land beyond these limits will, in the long term, only result in degradation and ever decreasing productivity. Accordingly, there are critical levels of populations that can be provided with food in perpetuity, from any given land area. Once the upper level has been reached, any attempts to provide food for populations in excess of the restrictions set by soil and climatic conditions, will ultimately result in failure. Degradation of land and eventual reduction in food production are the outcome of such practices.

Recognizing these facts within the context of a rapidly expanding world population, FAO and UNFPA, in collaboration with the International Institute for Applied Systems Analysis, initiated a project to determine the limits of the food producing capacities of lands. A further objective is to compare these estimates with data on present and projected populations and so identify crucial areas where land resources are insufficient to feed existing and/or future populations and where action is urgently required to rectify this situation. It is hoped that the results of the study will be used for planning future population activities and that the work will shed light on issues related to migration, international and interregional trade and land use.

The present study describes the methodology used and presents illustrative results for the continent of Africa. These results are compared with present and projected population data and critical areas identified where action is considered urgent. The reported work has been guided by international expert consultations held under the auspices of FAO and UNFPA. 2/

1/ FAO, Agriculture: Toward 2000. FAO Twentieth Session Conference Document. C 79/24. FAO, Rome, 1979.

2/ FAO/UNFPA, Report on the first FAO/UNFPA expert consultation on land resources for populations of the future. FAO, Rome, 1978 and FAO/UNFPA, Report on the Second FAO/UNFPA expert consultation on land resources for populations of the future. FAO, Rome, 1980.

* Prepared by the Food and Agriculture Organization of the United Nations.

The reader should keep in mind that the results and their analysis represent a first approximation and need to be interpreted with due caution. More detailed country studies are required and will be the object of a second phase of the project.

A. General Methodology

The methodology developed, to assess the potential population supporting capacity of land, uses six principles which are fundamental to any sound evaluation of the productive capacity of land namely:

i. land suitability is only meaningful in relation to a specific use, e.g. land suited to the cultivation of cassava is not necessarily suited to the cultivation of pearl millet;

ii. the evaluation of production potential is made in respect of specified input levels, e.g. whether fertilizers are applied, if pest control is effected, if machinery or hand tools are being used;

iii. suitability refers to use on a sustained basis, that is the envisaged use of land must not result in its depletion, e.g. through wind-erosion, water-erosion, salinization or other degradation processes;

iv. evaluation involves comparison of more than one alternative type of land use, e.g. suitability for millet or sorghum or maize, and not just for a single crop;

v. different kinds of land use are compared at least on a simple economic basis, i.e. suitability for each use is assessed by comparing the value of the produce to the cost of production;

vi. an interdisciplinary approach is adopted, the evaluation being based on inputs from crop ecologists, agronomists, climatologists and economists, in addition to those from pedologists.

These principles are described in a "Framework for Land Evaluation" [3] and are as formulated over the past years through international cooperation.

Basic to the assessment is the soil and climatic inventory. The climatic inventory differentiates major climates (e.g. warm tropical lowlands) and lengths of growing period zones at 30 days intervals (e.g. 120-150 days). The Soil Map records the composition, location and extent of some 5,000 mapping units which are associations of soil units. The legend to the map is based on 26 major soil units and 12 phases important to management. Measurement of the unique agro-ecological zone resulting from this combination allows quantification of the land resources of all developing countries in terms of soil and climatic requirements of crops.

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[3] FAO. A framework for land evaluation. Soils Bull. 32. FAO, Rome, 1976.

The inventory quantifies, by country, the extent of each individual soil unit (broken down by phase, slope and texture class) as it occurs in each major climate and in each length of growing period zone.

The assessment has been made by country as in such a global evaluation, it was not possible to take into account the existing or projected trade of food supplies between countries.

Prior to the analysis of the inventory to ascertain maximum potential calorie production, deductions are made for land required for non-agricultural use, for irrigation and for rest period requirements. The result of these deductions are country inventories of land annually available for rainfed cultivation. Each data cell (agro-ecological zone) of this inventory (more than 35,000 data cells for Africa) is then analysed separately for all 6 crops of the study (and livestock production) to ascertain which use is most productive under the unique circumstances of the zones' soil and climatic conditions.

This is achieved by firstly applying major climate/crop temperature requirement rules to ascertain which crops can be considered further. Individual crop productivity rules, as determined for each major climate and each length of growing period zone, are then applied and deductions for seed and waste (also crop dependent) follow. Subsequently appropriate degradation hazard rules (dependent on crop and soil and climatic conditions) are introduced to arrive at estimates of agro-climatic productivity. Application of limitations imposed by soil, phase, slope and texture limitations then allows computation of land productivity under the circumstance of cultivation of each of 6 crops assessed in the study including grass-land.

The next step in the methodology is to calculate calorie-protein production from the different crops through application of crop-/calorie-protein composition rules. Selection of the crop giving the highest calorie-protein production in each cell is then effected and the result from each cell in a length of growing period zone is totalled to arrive at the maximum potential calorie-protein production from each zone in each country. A constraint of retaining the presently grown mixture of crops on all land is included in the low level of input assessment to allow for continued dietary preference for presently grown and consumed crops. Data on the presently grown mixture of crops in each length of growing period zone is derived from present land use inventories.

Once the maximum potential calorie-protein production (for each length of growing period zone) is ascertained, application of country specific calorie-protein requirement _per capita_ data allows computation of the potential population supporting capacity in each zone in each country. This data is computed as potential population densities (persons per hectare) and is compared with present population density data to identify critical zones where, according to the level of input envisaged, potential sustained production from land resources is insufficient to meet the food needs of the populations already living in those areas. Country population projections for the year 2000 - U.N. medium term projections, are also compared with country potential population densities to identify critical countries, i.e. countries which will be critical with regard to food production for their future populations.[4] The results for Africa are presented in the present contribution.

B. Analysis of Potential Population Supporting Capacities

Quantification of the maximum production potential of agro-ecological zones for rainfed crop production, allows analysis of the potential population supporting capacities of the zones under the various levels of inputs considered. However, simple conversion of potential rainfed crop production data into energy production and supportable populations, although an essential part of the analysis, is not in itself sufficient to give a reliable figure on potential population supporting capacities. Present dietary preferences, country calorie-protein requirements and production from irrigated areas must also be considered. These components and the reiterative nature of the undertaken analysis are described below.

1. Calorie-protein conversion factors

The first step in the analysis is to convert all potential crop production data from each cell (agro-ecological zone) of the land inventory into the corresponding calorie and protein production according to the calorie and protein composition of the crops. Table 15.1 shows the international nutritive values (calorie and protein) used for calculating the energy values of potential crop production.

The result of this analysis is quantification of the calorie and protein production resulting from each crop alternative as applicable to each agro-econological zone.

2. Dietary preference

Traditional subsistence cultivation has, to a large extent determined the food familiarity/dietary preference of population. Therefore, an instant change in cultivation pattern (i.e. new crops instead of presently grown crops), to obtain maximum calorie/protein production, cannot be considered a realistic short-term possibility. Years of extension work, seed supply schemes and reliable marketing facilities are required before such changes can be envisaged, even to meet basic food needs. Accordingly, in the assessment of potential population supporting capacities, account has been taken of the mixture of presently grown crops and the relative proportions of their areas of cultivation. While such data is available on an administrative area basis for most countries, it is not available on an agro-ecological zone basis. Such an inventory is in progress for all countries in the developing world as an essential prerequisite to computation of potential population supporting capacities; it is complete for Africa and Southwest Asia.

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[4] The analysis does not take into account existing or projected trade of food supplies between countries.

Table 15.1. International Nutritive Values a/ to be used for calculated energy value of 100 g of food product

Crop	Food product	Calorie (K Cal)	Protein (g)	Suggested factor for converting yield dry weight into food product
Wheat	Dry grain	262	7.8	1.00
Rice	Dry paddy	234	4.4	1.54 b/
Maize	Dry grain	327	7.6	1.00
Barley	Dry grain	277	7.2	1.00
Millet	Dry grain	306	8.7	1.00
Sorghum	Dry grain	309	9.1	1.00
Groundnut	Dry unshelled nut	388	18.2	1.54 c/
Bean	Dry grain	341	22.1	1.00
Soybean	Dry grain	335	38.0	1.00
White potato	Fresh tuber	70	1.7	3.33 d/
Sweet potato	Fresh tuber	97	1.1	3.13 e/
Cassava	Fresh tuber	109	0.9	2.86 f/
Sugarcane	Fresh cane	30	0.2	10.00 g/
Banana - plantain	Fresh fruit with skin	70	0.8	3.70 h/
Oil palm	Oil	884	-	1.00

a/ Used in FAO food balance sheets for converting production into food. Reference: Food Consumption Tables for Use in Africa. FAO/USDHEW, 1968.

b/ Grain to paddy ratio = 0.65

c/ Kernel to nut ratio = 0.65

d/ Moisture content = 70 per cent

e/ Moisture content = 68 per cent

f/ Moisture content = 65 per cent

g/ Sugar in fresh cane = 10 per cent

h/ Skin = 10 per cent of total weight; moisture content = 70 per cent

Results for Africa, for agro-ecological zones, show a picture of food crop cultivation closely correlated with zones defined in terms of the length of the growing period, growing period zones. Tropical and sub-tropical areas with summer rainfall in Africa have the following food crop cultivation patterns (Table 15.2).

Table 15.2. Present land use patterns - Africa

Length of Growing Period Zone (days)	General Description	Main Crops a/
WARM TROPICS, AND SUB-TROPICS WITH SUMMER RAINFALL		
75-120	Arid/Semi-arid	Millet-Sorghum
120-150	Semi-arid	Sorghum-Maize/Millet-(Groundnut/Bean)
150-180	Semi-arid/Sub-humid	Sorghum/Millet-Maize-(Groundnut/Bean)
180-270	Sub-humid	Maize/Sorghum-Cassava-(Rice)
270-330	Sub-humid/Humid	Cassava/Maize-Groundnut/Rice-(Plantain/Sugar)
330-365	Humid	Cassava-Maize-Plantain-Rice-(Oil palm)
MODERATELY COOL AND COOL SUB-TROPICS WITH SUMMER RAINFALL		
120-365	Semi-arid/Humid	Maize - Beans (Wheat/Barley)
COOL SUB-TROPICS WITH WINTER RAINFALL		
75-120	Arid/Semi-arid	Barley-Wheat
120-270	Semi-arid/Sub-humid	Wheat-Barley

a/ Crops in parenthesis occupy smaller areas than crops not in parenthesis.

The present land use pattern, as determined, is introduced into the analysis of potential population supporting capacities at the stage of optimizing the total calorie and protein production in each length of growing period zone (by addition of the optimum production from each cell contained in each zone). It is applied as follows, according to the level of input being considered :

For the low level of input analysis, the pattern of the presently grown mixture of crops is rigidly maintained as a constraint on all potentially cultivable land even though the crops presently grown may be inferior in terms of calorie-protein productivity.

At the intermediate level of input the present land use pattern is applied only to presently cultivated areas : any balance of cultivable land is allocated to crops providing the highest calorie-protein production, immaterial of the presently grown mixture of crops.

The analysis of potential population supporting capacities at the high level of input assumes that all cultivable land is devoted to crops giving the highest calorie-protein production, immaterial of the presently grown mixture of crops, thus it includes the positive effect of an optimal cropping pattern, ignoring effective demands, therefore overstating the effects of technological change.

In all three analyses, production from irrigated land enters into the computation of optimum production from each zone. This input is both in terms of calorie-protein production and in terms of contribution to maintaining the present crop mix, as appropriate to the level of input being considered. Data on present and projected 5/ extents of irrigated land and present and projected irrigated crop production by countries broken down my major climate and length of growing period zones 6/ has been used in the analysis.

5/ FAO. Agriculture: Toward 2000. op. cit.

6/ Wood, S.R. The allocation of irrigated areas and production by agro-ecological zones. Consultant's Working Paper No. 7. FAO/UNFPA Project INT 75/P13., 1979.

3. Country Calorie/Protein Requirements

The computation of potential population supporting capacity was based on the calorie/protein requirements as governed by the composition of country populations. These requirements are presented in Table 15.3.[7]

This minimum protein-calorie constraint by countries (to avoid excessive carbohydrate production) is incorporated into the analysis [8] in the form of a linear programme. Optimization of calorie-protein production at the zone level is reiterative for each zone until both the calorie-protein constraint and the applicable present crop mix constraint are met. Accordingly, the analysis does not assume transfer of produce from one zone to another.

C. Results

The computations simulate long-term (in perpetuity) capacity of zones to meet the calorie and protein requirements of the population under three alternative consumptions, namely :

High Level of Inputs	The ultimate potential capacity if all rainfed cultivable land were put to optimal use through application of high levels of inputs including complete mechanization, complete installation of all necessary soil conservation measures and cultivation of only the most calorie-protein productive crops.
Intermediate Levels of Inputs	The potential capacity if all rainfed cultivable land were utilized under an intermediate level of inputs, with crop optimization confined to presently unused (but potentially cultivable) areas and with application of simple conservation measures to lessen land degradation.

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[7] FAO. Report on the agro-ecological zones project. Vol. 4, Results for Southeast Asia. World Soil Resources Report No. 48/4, AGLS, FAO, Rome, 1980 and FAO, Report on the second FAO/UNFPA expert consultation on land resouces for populations of the future. Working Sheet 4, FAO, Rome, 1980.

[8] Shah, M.M. and Fisher, G., Assessment of population supporting capacities overall computer programmes. Consultants' Working Paper, FAO/UNFPA Project INT 75/P13, AGLS, FAO, Rome, 1979.

Table 15.3. Africa Calorie/Protein Requirements by Countries
(per capita per day)

COUNTRY	CALORIES	PROTEINS	RATIO
ALGERIA	2,400	55.8	43.0
ANGOLA	2,350	38.0	61.8
BENIN	2,300	39.6	58.1
BOTSWANA	2,320	39.5	58.7
BURUNDI	2,330	48.1	59.0
CAMEROON	2,320	38.1	60.9
CAPE VERDE	2,350	38.0	61.8
CENTRAL AFRICAN REPUBLIC	2,260	36.0	62.8
CHAD	2,380	39.5	60.3
COMORO IS	2,340	41.7	56.1
CONGO	2,220	34.8	63.8
EGYPT	2,510	45.7	54.9
ETHIOPIA	2,330	39.9	58.4
GABON	2,340	34.9	67.0
GAMBIA	2,380	38.6	61.7
GHANA	2,300	36.5	63.0
GUINEA	2,310	38.8	59.5
GUINEA BISSAU	2,310	38.8	59.5
IVORY COAST	2,310	35.7	64.7
KENYA	2,320	38.8	59.8
LESOTHO	2,280	39.3	58.0
LIBERIA	2,310	37.3	61.9
LIBYA	2,360	42.7	55.3
MADAGASCAR	2,270	36.6	62.0
MALAWI	2,320	50.2	46.2
MALI	2,350	41.7	56.4
MAURITANIA	2,310	35.2	65.6
MAURITIUS	2,270	36.5	62.2
MOROCCO	2,420	46.7	51.8
MOZAMBIQUE	2,340	41.7	56.1
NAMIBIA	2,280	39.3	58.0
NIGER	2,350	39.2	59.9
NIGERIA	2,360	42.9	55.0
REUNION	2,270	36.6	62.0

continued ...

Table 15.3 (continued)

COUNTRY	CALORIES	PROTEINS	RATIO
ZIMBABWE	2,390	42.8	55.8
RWANDA	2,320	47.0	49.4
SENEGAL	2,380	34.7	68.6
SIERRA LEONE	2,300	38.8	59.3
SOMALIA	2,310	34.1	67.7
SPANISH NORTH AFRICA	2,420	46.7	51.8
SUDAN	2,350	38.0	61.8
SWAZILAND	2,320	39.5	58.7
TANZANIA	2,320	37.3	62.2
TOGO	2,300	37.6	61.2
TUNISIA	2,390	50.2	47.6
UGANDA	2,330	37.3	62.5
UPPER VOLTA	2,370	45.2	52.4
WEST SAHARA	2,310	35.2	65.6
ZAIRE	2,220	37.6	59.0
ZAMBIA	2,310	39.3	58.8
ZIMBABWE	2,390	42.8	55.8

Source : FAO/WHO, 1971

Low Level of Inputs	The potential capacity, assuming only hand labour inputs (no fertilizers, pesticides, insecticides) and extending the presently grown mixture of crops to all potentially cultivable lands but without conservation measures and hence with productivity losses due to land degradation.

These estimates are compared on a country basis, with data on present populations in growing period zones to identify critical country areas where land resources are insufficient to meet present food needs.

While there is no suitable methodology to undertake population projections on a zone basis, projections, prepared by the United Nations, are available on a country basis. [9] Therefore, appropriate zone potential population supporting capacities are aggregated to arrive at the potential for each country as a whole and these country potentials are compared with the medium variant country population projections (year 2000) data as well as with present population data. This allows identification of critical countries where land resources are (or will be) insufficient to supply the food needs of present and/or projected country populations.

The present population data employed in this comparison is based on the most recent census data for administrative areas, the zone totals being derived from this by map overlays and approximation according to the extent of zone areas occurring in the administrative areas. For these computations, the census data, which corresponded with various dates, were brought forward to 1975 and the country totals adjusted to correspond to the current United Nations estimates.

The results of these comparisons, for Africa, are as follows :

1. Summarized Zone Results

Results of the assessment for each zone in Africa, combined for all countries, are presented in Table 15.4 by major climates. The zones occurring in each major climate are listed on the left hand.

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[9] United Nations, World Population Trends and Prospects by Country, 1950-2000. Summary report of the 1978 assessment. (United Nations, ST/ESA/SER.R/33, New York, 1979).

Table 15.4. Potential population supporting capacities of length of growing period zones in Africa (Densities in persons per hectare

LGP ZONE (days)	TOTAL LAND (000 HA)	PRESENT POPULATION (000)	PRESENT DENSITY	LOW INPUTS		INTERMEDIATE INPUTS		HIGH INPUTS	
				POTENTIAL DENSITY	RATIO	POTENTIAL DENSITY	RATIO	POTENTIAL DENSITY	RATIO
WARM TROPICS									
365^{+} N	19 791	1 367	0.069	1.434	20.783	6.113	91.783	8.986	110.2
365^{-} N	127 585	40 636	0.319	1.610	5.054	4.689	15.351	12.546	[illegible]
330-364 N	75 016	16 189	0.216	1.373	6.364	5.333	24.711	11.168	[illegible]
300-329 N	73 264	16 555	0.226	1.440	6.374	6.068	26.855	13.431	59.4
270-299 N	127 820	29 556	0.231	0.876	3.788	4.698	20.317	10.209	44.1
240-269 N	133 423	25 157	0.189	0.919	4.876	4.427	23.481	11.577	61.40
210-239 N	129 920	20 416	0.157	0.659	4.194	2.891	18.399	10.535	67.0
180-209 N	225 745	36 794	0.163	0.492	3.017	2.149	13.185	8.368	51.34
150-179 N	175 044	29 814	0.170	0.503	2.952	2.327	13.660	9.027	53.00
120-149 N	114 190	24 917	0.218	0.135	0.619	0.759	3.478	5.214	23.85
90-119 N	72 051	12 661	0.176	0.075	0.426	0.247	1.404	3.179	18.04
75-89 N	58 436	7 661	0.131	0.059	0.452	0.144	1.100	1.557	[illegible]
1-74 N	370 809	23 825	0.064	0.034	0.529	0.043	0.673	0.058	[illegible]
0 (dry)	180 563	4 620	0.026	0.000	0.005	0.000	0.005	0.000	[illegible]
1-74 I	64 808	1 299	0.020	0.007	0.344	0.015	0.727	0.027	[illegible]
75-89 I	22 707	1 134	0.050	0.033	0.656	0.106	2.118	0.919	18.3
90-119 I	49 590	3 229	0.065	0.030	0.454	0.152	2.335	2.013	30.9
120-149 I	43	11	0.250	0.107	0.429	0.507	2.026	2.355	9.42
Sub-total	2 020 797	295 841	0.146	0.496	3.397	2.075	14.212	6.110	41.86
MODERATELY COOL TROPICS									
365^{-} N	1 446	398	0.275	0.011	0.041	0.056	0.205	0.873	3.171
330-364 N	1 568	693	0.442	0.052	0.118	0.273	0.618	2.265	5.12
300-329 N	2 138	1 022	0.478	0.166	0.347	0.648	1.355	3.269	6.841
270-299 N	7 293	3 223	0.442	0.252	0.570	0.854	1.933	4.770	10.795
240-269 N	10 570	4 754	0.450	0.334	0.743	1.049	2.333	5.141	11.862
210-239 N	9 586	2 855	0.298	0.360	1.209	1.392	4.674	5.741	19.27
180-209 N	8 775	2 400	0.273	0.316	1.154	1.259	4.603	5.073	18.55
150-179 N	4 225	1 657	0.392	0.251	0.641	0.852	2.172	3.704	9.444
120-149 N	3 887	1 158	0.298	0.138	0.464	0.502	1.685	2.195	7.3
90-119 N	4 709	1 029	0.219	0.025	0.114	0.057	0.259	0.124	[illegible]
75-89 N	2 551	702	0.275	0.022	0.078	0.051	0.184	0.115	0.317
1-74 N	1 466	246	0.168	0.047	0.281	0.061	0.362	0.078	0.444
0 (dry)	2 750	0	0.0	0.036		0.036		0.036	
1-74 I	2 453	20	0.008	0.008	0.956	0.017	1.947	0.024	2.818
75-89 I	131	0	0.008	0.004	0.536	0.011	1.521	0.026	3.476
90-120 I	64	0	0.0	0.004		0.011		0.025	
Sub-total	63 612	20 157	0.317	0.220	0.695	0.783	2.470	3.594	11.309
COOL TROPICS									
365^{-} N	697	193	0.276	0.008	0.030	0.042	0.152	0.280	1.014
330-364 N	749	317	0.424	0.027	0.063	0.178	0.420	0.612	1.443
300-329 N	1 010	470	0.466	0.040	0.086	0.183	0.392	0.616	1.365
270-299 N	3 534	1 420	0.402	0.084	0.210	0.306	0.763	[illegible]	2.251
240-269 N	5 084	2 276	0.448	0.167	0.373	0.681	1.522	[illegible]	[illegible]
210-239 N	4 607	1 357	0.295	0.283	0.960	1.001	3.400	3.529	[illegible]
180-209 N	4 226	1 143	0.271	0.375	1.387	1.399	5.169	[illegible]	[illegible]
150-179 N	1 905	749	0.377	0.239	0.632	0.833	2.206	[illegible]	[illegible]
120-149 N	1 807	539	0.298	0.137	0.460	0.509	1.707	[illegible]	[illegible]
90-119 N	2 044	431	0.211	0.028	0.134	0.066	0.313	0.127	[illegible]
75-89 N	1 185	335	0.283	0.022	0.079	0.053	0.188	0.116	[illegible]
1-74 N	678	109	0.161	0.010	0.064	0.024	0.152	0.041	[illegible]
0 (dry)	1 359	0	0.0	0.0		0.0		0.0	
1-74 I	1 223	9	0.007	0.008	1.114	0.017	2.269	0.024	3.281
75-89 I	64	0	0.0	0.005		0.011		0.025	
90-119 I	31	0	0.0	0.004		0.010		0.023	
Sub-total	30 283	9 348	0.309	0.163	0.527	0.602	1.950	2.329	7.546
COLD TROPICS									
0 (cold)	2 905	1 070	0.368	0.0	0.0	0.0	0.0	0.0	0.0
Sub-total	2 905	1 070	0.368	0.0	0.0	0.0	0.0	0.0	0.0

Ratio = ratio of potential to present populations.

Table 15.4. (continued)

LGP ZONE (days)	TOTAL LAND (000 HA)	PRESENT POPULATION (000)	PRESENT DENSITY	LOW INPUTS POTENTIAL DENSITY	LOW INPUTS RATIO	INTERMEDIATE INPUTS POTENTIAL DENSITY	INTERMEDIATE INPUTS RATIO	HIGH INPUTS POTENTIAL DENSITY	HIGH INPUTS RATIO
WARM SUB-TROPICS WITH SUMMER RAINFALL									
270-299 N	48	17	0.357	0.054	0.152	3.677	10.296	4.270	11.957
240-269 N	28	9	0.333	0.070	0.211	1.560	4.681	4.063	12.190
210-239 N	30	10	0.333	0.077	0.232	0.649	1.948	3.993	11.979
180-209 N	593	192	0.324	1.138	3.517	3.796	11.733	6.118	[illegible]
0 (dry)	227 611	1 509	0.007	0.000	0.025	0.000	0.025	0.000	0.025
1-74 I	8 849	108	0.012	0.007	0.547	0.013	1.096	0.020	[illegible]
75-89 I	684	23	0.034	0.047	1.374	0.207	6.078	1.207	35.396
90-119 I	1 456	110	0.075	0.141	1.869	0.456	6.036	2.051	27.175
120-149 I	260	66	0.254	0.651	2.566	2.178	8.581	4.753	18.725
150-179 I	282	86	0.307	0.705	2.299	2.193	7.149	3.945	12.863
Sub-total	239 840	2 130	0.009	0.006	0.649	0.019	2.176	0.044	4.898
MODERATELY COOL SUB-TROPICS WITH SUMMER RAINFALL									
240-269 N	25	4	0.154	0.344	2.234	0.794	5.160	2.044	13.283
210-239 N	25	4	0.154	0.372	2.419	0.992	6.447	2.142	13.925
180-209 N	371	104	0.282	0.303	1.074	1.073	3.808	2.651	9.407
0 (dry)	3 992	11	0.003	0.0	0.0	0.0	0.0	0.0	0.0
1-74 I	730	172	0.236	0.008	0.033	0.016	0.067	0.020	[illegible]
75-89 I	80	37	0.459	0.005	0.012	0.012	0.026	0.018	[illegible]
90-119 I	194	90	0.464	0.136	0.293	0.014	0.030	0.234	0.504
120-149 I	261	130	0.500	0.165	0.330	0.291	0.583	0.593	1.187
150-179 I	654	297	0.455	0.293	0.644	0.563	1.238	1.265	2.782
Sub-total	6 332	849	0.134	0.063	0.468	0.142	1.061	0.337	2.509
COOL SUB-TROPICS WITH SUMMER RAINFALL									
240-269 N	10	3	0.308	0.009	0.028	0.029	0.096	0.153	0.498
210-239 N	10	1	0.154	0.020	0.128	0.033	0.215	0.135	0.879
180-209 N	185	50	0.271	0.362	1.336	0.958	3.538	2.657	9.811
0 (dry)	1 984	5	0.003	0.0	0.0	0.0	0.0	0.0	0.0
1-74 I	292	51	0.176	0.008	0.045	0.016	0.089	0.018	0.100
75-89 I	34	16	0.460	0.005	0.012	0.012	0.026	0.019	0.041
90-119 I	91	42	0.458	0.006	0.014	0.014	0.030	0.221	0.482
120-149 I	126	63	0.500	0.083	0.167	0.211	0.421	0.522	1.044
150-179 I	324	147	0.455	0.189	0.416	0.484	1.062	1.239	2.723
Sub-total	3 506	378	0.124	0.047	0.375	0.120	0.969	0.323	2.607
COLD SUB-TROPICS WITH SUMMER RAINFALL									
0 (cold)	185	37	0.201	0.0	0.0	0.0	0.0	0.0	0.0
Sub-total	185,	37	0.201	0.0	0.0	0.0	0.0	0.0	0.0
COOL SUB-TROPICS WITH WINTER RAINFALL									
240-269 N	84	31	0.368	0.204	0.554	0.770	2.090	2.818	7.703
210-239 N	7 589	7 735	1.019	0.261	0.256	1.208	1.185	2.782	2.729
180-209 N	7 167	7 469	1.042	0.421	0.404	1.963	1.883	4.016	3.854
150-179 N	5 635	3 297	0.585	0.647	1.106	1.919	3.279	3.449	5.893
120-149 N	5 819	2 829	0.486	0.409	0.842	1.323	2.720	2.515	5.173
90-119 N	7 751	2 644	0.341	0.411	1.205	0.808	2.370	1.337	3.919
0 (dry)	431 366	42 619	0.099	0.140	1.413	0.140	1.413	0.140	1.413
1-74 I	38 515	5 215	0.135	0.138	1.022	0.160	1.185	0.189	1.392
75-89 I	7 491	1 508	0.201	0.516	2.562	0.539	2.677	0.568	2.820
90-119 I	1 538	1 136	0.738	0.581	0.787	0.728	0.985	0.945	1.280
Sub-total	512 955	74 483	0.145	0.165	1.135	0.233	1.606	0.327	2.252
COLD SUB-TROPICS WITH WINTER RAINFALL									
0 (cold)	5 967	2 636	0.442	0.0	0.0	0.0	0.0	0.0	0.0
Sub-total	5 967	2 636	0.442	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL 1/	2 885 911	406 929	0.161	0.385	2.730	1.310	10.780	4.463	31.652

Underlining indicates potential population supporting capacity < present population

1/ excludes South Africa

The same results generally hold true for the relatively small areas with sub-tropical summer rainfall climates and the number of critical zones in both these climates of developing Africa are shown below by envisaged level of inputs.

Major Climate and (Total Number of Zones)		Number of Critical Zones under Low Inputs	Intermediate Inputs	High Inputs
Warm Tropical Lowlands	(18)	9	2	2
Moderately Cool Tropical Highlands	(16)	12	5	3
Cool Tropical Highlands	(16)	11	7	3
Cold Tropical Mountains	(1)	1	1	1
Warm Sub-tropics, Summer Rainfall	(10)	5	1	1
Moderately Cool Sub-tropics Summer Rainfall	(9)	6	5	4
Cool Sub-tropics Summer Rainfall	(9)	8	7	6
Cold Sub-tropics Summer Rainfall	(1)	1	1	1
Total	(80)	53	29	21

In contrast with these results covering developing Africa south of the Sahara, areas with sub-tropical winter rainfall climates are not so critical with application of an intermediate level of inputs.

In sub-tropical areas with winter rainfall in North Africa present population densities range from more than 1.0 persons per hectare in wetter areas to less than 0.1 persons per hectare in the driest areas. Given low levels of inputs such populations cannot rely on food produced from the available land resources in 5 out of the 10 zones occurring in North Africa. The worst situation would occur in the highly populated coastal zone of 210 days to 240 days growing period where the potential/present population ratio is 0.256.

Given intermediate levels of input, only one zone (90-120 days) is critical under intermediate levels of input and even in this case, the potential/present population ratio is very close to 1.0. Under high level of input circumstances, all growing period zones in the sub-tropics with winter rainfall could produce sufficient food for their constituent populations with the exception of the cold mountain areas. The number of critical zones in this climatic area of developing Africa is shown below by major climate and envisaged level of inputs.

Major Climate and (Total Number of Zones)		Number of Critical Zones under		
		Low Inputs	Intermediate Inputs	High Inputs
Cool Sub-tropics, Winter Rainfall	(10)	5	1	0
Cold Sub-tropics, Winter Rainfall	(1)	1	1	1
Total	(11)	6	2	1

2. Country Zone Results

Similar computations have been made for each zone of each developing country in Africa. These serve to further pinpoint critical zones, for while the overall result for a particular zone in Africa may be 'safe', the zone may be 'critical' in specific countries. These results, 14 major climates and 21 length of growing period zones for 51 countries, are too voluminous to record in tabular form and will accordingly be presented in map form in future reports.

In the warm tropical and sub-tropical (summer rainfall) lowlands under low level of input circumstance, the previously described situation for Africa as a whole remains valid for most countries, that is all growing period zones of more than 150 days duration have higher potential population supporting capacities than present population. Exceptions however do occur. They include : northern and southern areas in Ghana and Togo, large parts of highly populated Nigeria, north, east and southern areas of Ethiopia, some eastern areas in Uganda and Kenya, small proportions of Rwanda and Burundi, and western Malawi.

Growing period zones of less than 150 days duration are critical in most countries under low input circumstances, except in Chad, Sudan, Angola, Namibia, Zambia, Zimbabwe and Madagascar where the critical limit usually commences at 120 days.

Under intermediate level of input circumstances, the number and extent of critical zones is markedly reduced, both with regard to the general country situations and the above mentioned exceptions. Under such a level of inputs, only the zones with less than 75 days of growing period remain critical in most countries; notable exceptions being in northern areas of Senegal, Upper Volta, Niger, Nigeria and southern Kenya.

Under high level of input circumstances, few zones (outside of desert areas) remain critical in the warm tropics. These critical zones are comprised of lands with steeply sloping terrain which precludes cultivation under the mechanized conditions envisaged at the high level of inputs circumstance. Such terrain is at least part cultivable with animal power as envisaged at the intermediate level of inputs circumstance.

The position in the moderately cool, cool and cold tropics and sub-tropics (summer rainfall) climates also generally follows the previously described situation for Africa as a whole. Reference is made to individual country zone potential/present population ratios in the description of these areas and, in view of the critical situation, an expanded description is presented together with a separate table (Table 15.5).

Six countries namely Ethiopia, Kenya, Rwanda, Burundi, Tanzania and Lesotho have considerable extents of land in such climates and in each there is a serious situation in most of their highland areas.

Under low input conditions, the majority of all growing period zones are critical. In both Rwanda and Burundi, all zones are critical, the potential/present population ratios varying from an exceptionally low 0.02 to 0.54. In Kenya, Tanzania and Lesotho only isolated zones are not

Table 15.5. Potential to present population ratios in moderately cool and cool tropics in selected countries by length of growing period zones.

COUNTRY		LENGTH OF GROWING PERIOD ZONES (days) 330–364 MC	C	300–329 MC	C	270–299 MC	C	240–269 MC	C	210–239 MC	C	180–209 MC	C	150–179 MC	C	120–149 MC	C	90–119 MC	C	75–89 MC	C	1–74 MC	C
ETHIOPIA	L	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.53	1.09	0.52	1.20	1.02	1.19	1.50	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	I	1.17	[illegible]	[illegible]	[illegible]	6.24	2.07	4.50	[illegible]	[illegible]	[illegible]	5.39	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	H	10.6	2.59	16.9	2.70	33.6	5.75	18.6	10.7	19.4	11.1	20.0	18.9	13.6	11.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
KENYA	L	0.07	0.01	[illegible]	0.03	[illegible]	0.08	[illegible]	0.14	0.14	0.32	0.07	1.72	[illegible]	[illegible]	[illegible]	[illegible]	0.05	0.05	[illegible]	[illegible]	[illegible]	[illegible]
	I	0.01	[illegible]	[illegible]	[illegible]	[illegible]	0.14	[illegible]	0.24	[illegible]	[illegible]	4.10	3.96	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	H	1.40	0.27	[illegible]	[illegible]	[illegible]	1.03	4.75	3.32	5.09	4.77	14.2	13.7	3.33	3.25	2.51	[illegible]	0.39	0.44	[illegible]	[illegible]	[illegible]	[illegible]
RWANDA	L	[illegible]	0.02	[illegible]	[illegible]	0.03	0.03	0.47	0.34	0.53	0.50												
	I	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.07	1.61	1.30	[illegible]	[illegible]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	H	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5.06	4.12	4.65	3.52												
BURUNDI	L					0.04	0.07	0.13	0.04	[illegible]	[illegible]												
	I	n.a.	n.a.	n.a.	n.a.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	H					13.9	0.37	[illegible]	14.3	[illegible]	[illegible]												
TANZANIA	L					0.02	0.06	0.30	0.34	[illegible]	0.54	[illegible]	0.93	1.71	1.67	1.15	0.56	0.27	[illegible]	0.13	[illegible]	[illegible]	[illegible]
	I	n.a.	n.a.	n.a.	n.a.	0.04	0.04	1.02	[illegible]	[illegible]	[illegible]	4.18	[illegible]	5.01	[illegible]	[illegible]	[illegible]	0.50	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	H					1.09	0.41	6.08	5.13	[illegible]	5.52	19.4	19.1	25.9	[illegible]	[illegible]	15.1	1.01	1.01	[illegible]	[illegible]	[illegible]	[illegible]
LESOTHO	L							2.33	0.02	2.41	[illegible]	1.07	1.33	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	I	n.a.	n.a.	n.a.	n.a.			5.16	0.09	6.44	[illegible]	3.90	3.53	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	H							13.2	[illegible]	13.9	[illegible]	9.40	9.31	2.78	2.71	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

C = COOL TROPICS
MC = MODERATELY COOL TROPICS
L = LOW LEVEL OF INPUTS
I = INTERMEDIATE LEVEL OF INPUTS
H = HIGH LEVEL OF INPUTS
n.a.= not applicable

critical and even in these countries the potential/present population ratios are close to the danger point of 1.0, i.e. Kenya 1.22, Tanzania 1.16 to 1.71 and Lesotho 1.07 to 2.41. In each country the situation is worse in the cool climatic areas. These are indeed critical situations for the populations living in these climates, a point which has perhaps not received as wide publicity and recognition as the situation in the Sahel. However the important cash output from tree crops in these areas is a mitigating circumstance in comparison to the Sahelian situation.

Only at the intermediate level of inputs does the position appear to improve. However, even with application of such inputs, all zones in Burundi remain critical with ratios of 0.13 to 0.74. In Kenya two zones become safe, but one with a near critical ratio of 1.09. In Rwanda two zones are removed from the critical list but again with low ratios (1.30 to 1.62). Only in Ethiopia and Lesotho does the situation materially improve with six and three zones respectively having the resources to meet the needs of the present populations; the drier zones in these later two countries however still remain critical.

Application of high levels of inputs has the most beneficial influence in Kenya, Burundi and Lesotho, markedly reducing the number of critical zones. The growing period zones in Kenya and Lesotho remaining critical are confined to areas with lengths of growing periods of less than 120 days and the same is true in Ethiopia and Tanzania. The critical situation facing short growing period zones is also reflected in the results for sub-tropical winter rainfall areas. The 1-74 day growing period zone in the majority of countries in North Africa remains critical at all input levels. Exceptions are countries such as Egypt and Libya with large areas of irrigation located in this zone. Irrigation complicates and indeed dominates the country zone situation in this major climate and the unique situation of Egypt points to the importance of taking into account country specific forms of production when computing potential population supporting capacities.

It appears that, with one exception (Tunisia), all zones of more than 75 days growing period have sufficient land resources to meet the food needs of present populations under the intermediate level of input circumstance. In Tunisia a high level of input circumstance is needed before this situation is attained and even under this situation the 75-90 day zone still remains critical because of the slightly lower rainfall in comparison with adjacent areas (present/potential population ratio 0.16). In Egypt also one zone remains critical even under a high level of input circumstance namely the 75-90 day zone at the mouth of the Nile which contains the vast urban populations of Alexandria. The food needs of such locations can only be met from surrounding areas.

3. Present and Projected Populations by Country

The comparison of country's capacity to feed a population of a given size with present and projected country population data, for countries in Africa, is made in Table 15.6.

The overall (average) results show that, even under the low input situation, the continent as a whole has sufficient land resources to feed both its 1975 and projected (year 2000) populations. Under conditions of low inputs the potential/present (1975) population ratio is 2.73. Under intermediate input level circumstances the ratio is 10.8 and under high input levels it is 31.7. Even with the increased populations envisaged by the year 2000, the potential/projected ratios, although markedly reduced, still remain above 1.0 for all three sets of circumstances, being respectively 1.49, 5.42 and 15.5. Increases in the potential population supporting capacities, between 1975 and the year 2000, are due to additional production from planned expansions of irrigated land.

While this overall situation for the continent as a whole appears satisfactory, variations in land resources endowment result in wide differences between countries. At the country level the results of the potential population supporting capacity assessment vary from extremes of 0.0 (Western Sahara) to 12.20 (Zaire) persons per hectare. Although country areas extend over wide extremes of climatic and soil conditions, the previously described relationship between climatic conditions and potential population supporting capacities is still evident. Countries mainly located in long growing period zones have the highest production potentials, while those in the drier areas have the lowest and reflect the restrictive nature of the climate to rainfed production.

Comparisons of the country potentials with data on existing and projected country populations identify countries where the land resources are insufficient to meet the food needs of the people living on them. The frequency of this situation among developing world countries in Africa, according to level of inputs consumptions, is shown below :

NUMBERS OF 'CRITICAL' COUNTRIES WHERE POTENTIAL POPULATION SUPPORTING CAPACITY IS LESS THAN 1975/2000 POPULATIONS

Level of Inputs	1975 Population	2000 Population
High	2	4
Intermediate	9	13
Low	22	28

Table 15.6. Potential population supporting capacities - Africa, Densities per persons per hectare (and potential to present and future population ratios)

COUNTRY	1975			2000		
	LOW	INT.	HIGH	LOW	INT.	HIGH
ALGERIA	0.03 (0.48)	0.10 (1.69)	0.19 (3.24)	0.05 (0.40)	0.12 (0.90)	0.21 (
ANGOLA	0.47 (8.51)	2.15 (38.5)	7.78 (139)	0.47 (4.47)	2.15 (20.3)	7.77 (7
BENIN	0.56 (2.05)	2.66 (9.77)	9.42 (34.6)	0.55 (0.90)	2.61 (4.50)	9.42 (3
BOTSWANA	0.01 (0.85)	0.07 (4.21)	0.73 (43.8)	0.01 (0.40)	0.07 (2.10)	0.73 (2
BURUNDI	0.31 (0.20)	1.51 (0.95)	4.05 (2.55)	0.29 (0.10)	1.40 (0.40)	3.72 (
CAMEROON	0.60 (9.64)	4.35 (26.2)	12.1 (73.2)	1.59 (5.50)	4.32 (15.0)	12.1 (4
CAPE VERDE	0.01 (0.01)	0.01 (0.01)	0.02 (0.02)	0.01 (0.01)	0.01 (0.01)	0.02 (0
CENTRAL AFRICAN REPUBLIC	0.73 (22.6)	3.64 (113)	9.49 (296)	0.72 (12.5)	3.63 (62.5)	9.47 (16
CHAD	0.11 (3.50)	0.54 (17.3)	2.33 (74.9)	0.11 (1.98)	0.54 (9.40)	2.32 (40
COMOROS	0.46 (0.33)	2.55 (1.84)	5.57 (4.03)	0.44 (0.20)	2.45 (1.20)	5.37 (2
CONGO	1.08 (27.3)	4.53 (114)	11.5 (291)	1.09 (15.0)	4.53 (62.5)	11.5 (15
EGYPT	0.60 (1.51)	0.61 (1.51)	0.61 (1.51)	1.10 (1.60)	1.10 (1.60)	1.10 (1
EQUATORIAL GUINEA	1.37 (11.5)	3.99 (34.6)	11.3 (97.8)	1.37 (6.80)	3.97 (19.9)	11.2 (5
ETHIOPIA	0.17 (0.76)	0.63 (2.77)	2.67 (11.7)	0.20 (0.50)	0.65 (1.50)	2.67 (6
GABON	1.73 (98.1)	5.38 (305)	10.3 (585)	1.73 (67.9)	5.37 (211)	10.3 (405
GAMBIA	0.78 (1.73)	3.56 (7.88)	9.45 (20.9)	1.13 (1.32)	3.68 (4.30)	9.21 (10
GHANA	0.91 (1.87)	3.82 (7.88)	10.8 (22.4)	0.97 (0.94)	3.81 (3.70)	10.6 (10
GUINEA	0.61 (3.33)	2.16 (11.8)	7.15 (39.1)	0.61 (1.80)	2.15 (6.30)	7.13 (20
GUINEA-BISSAU	0.64 (4.37)	2.75 (18.8)	8.64 (59.2)	0.64 (2.70)	2.74 (11.6)	8.61 (36
IVORY COAST	1.43 (6.90)	5.38 (26.0)	11.6 (56.3)	1.42 (3.30)	5.30 (12.3)	11.5 (26.
KENYA	0.07 (0.30)	0.21 (0.94)	0.98 (4.38)	0.10 (0.20)	0.24 (0.43)	0.96 (1.
LESOTHO	0.18 (0.43)	0.42 (1.01)	1.02 (2.50)	0.17 (0.24)	0.41 (0.57)	1.01 (1.
LIBERIA	0.85 (5.26)	4.31 (26.6)	11.0 (68.0)	0.86 (2.41)	4.23 (11.9)	10.8 (30.
LIBYA	0.01 (1.17)	0.02 (2.21)	0.03 (3.95)	0.04 (1.90)	0.05 (2.40)	0.06 (3.
MADAGASCAR	0.81 (5.54)	3.32 (22.6)	9.80 (66.9)	0.93 (3.20)	3.38 (11.8)	9.73 (33.
MALAWI	0.64 (0.83)	2.44 (3.16)	6.58 (8.51)	0.71 (0.40)	2.37 (1.40)	6.21 (3.
MALI	0.06 (1.27)	0.29 (5.87)	1.41 (28.5)	0.08 (0.90)	0.31 (3.10)	1.40 (14.
MAURITANIA	0.01 (0.50)	0.02 (1.15)	0.08 (5.44)	0.02 (0.50)	0.02 (0.80)	0.08 (2.
MAURITIUS	2.79 (0.62)	5.64 (1.26)	4.63 (1.03)	5.01 (0.71)	9.03 (1.28)	8.84 (1.
MOROCCO	0.27 (0.78)	0.58 (1.65)	1.00 (2.88)	0.62 (0.80)	0.90 (1.20)	1.29 (1.
MOZAMBIQUE	0.48 (4.44)	2.01 (18.4)	6.80 (62.4)	0.50 (2.30)	2.01 (9.40)	6.76 (31.
NAMIBIA	0.01 (0.80)	0.02 (2.23)	0.40 (37.9)	0.01 (0.40)	0.02 (1.10)	0.40 (19.
NIGER	0.01 (0.15)	0.02 (0.44)	0.34 (8.89)	0.01 (0.10)	0.02 (0.30)	0.34 (4.
NIGERIA	0.55 (0.77)	2.37 (3.27)	8.14 (11.3)	0.56 (0.30)	2.24 (1.40)	7.60 (4.
REUNION	0.55 (0.28)	1.84 (0.96)	6.54 (3.41)	0.52 (0.20)	1.76 (0.60)	6.25 (2.

Table 15.6. (continued)

Country	1975						2000					
	Low		Int.		High		Low		Int.		High	
RWANDA	0.25	(0.17)	1.36	([illegible])	3.21	(2.13)	0.25	([illegible])	1.29	([illegible])	2.96	([illegible])
SAO TOME & PRINCIPE	1.61	(1.93)	5.83	(6.70)	9.12	(10.9)	1.60	(1.70)	5.81	(6.30)	9.08	(9.90)
SENEGAL	0.23	(0.89)	1.12	(4.34)	5.34	(20.8)	0.39	(0.80)	1.26	(2.50)	5.32	(10.8)
SIERRA LEONE	0.79	(1.92)	3.87	(9.40)	6.53	(15.9)	0.82	(1.00)	3.79	(4.70)	6.35	(7.80)
SOMALIA	0.02	(0.39)	0.04	(0.76)	0.10	(2.09)	0.03	(0.30)	0.05	(0.50)	0.12	(1.20)
SUDAN	0.27	(4.19)	0.96	(15.1)	4.18	(65.4)	0.35	(2.80)	1.04	(8.40)	4.24	(34.1)
SWAZILAND	0.64	(2.29)	2.27	(8.12)	4.29	(15.4)	0.63	(1.20)	2.23	(4.10)	4.23	(7.80)
TANZANIA	0.39	(2.28)	1.64	(9.60)	5.72	(33.4)	0.42	(1.10)	1.66	(4.40)	5.68	(15.1)
TOGO	0.69	(1.61)	3.38	(7.95)	9.66	(22.7)	0.72	(0.78)	3.34	(3.70)	9.35	(10.2)
TUNISIA	0.13	(0.36)	0.28	(0.81)	0.53	(1.51)	0.38	(0.60)	0.53	(0.90)	0.76	(1.30)
UGANDA	0.54	(0.97)	2.08	(3.71)	7.63	(13.6)	0.54	(0.48)	2.02	(1.70)	7.38	(6.10)
UPPER VOLTA	0.25	(1.12)	0.98	(4.40)	5.43	(24.4)	0.27	(0.60)	0.99	(2.30)	5.37	(12.4)
WESTERN SAHARA	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
ZAIRE	1.17	(5.44)	5.28	(24.46)	12.33	(56.9)	1.16	(2.86)	5.23	(12.62)	12.20	29.82
ZAMBIA	0.62	(14.2)	2.99	(68.7)	10.4	(238)	0.62	(6.50)	2.97	(31.6)	10.3	(110)
ZIMBABWE	0.28	(1.75)	1.54	(9.60)	5.62	(35.0)	0.36	(0.99)	1.59	(4.40)	5.54	(15.5)
AVERAGE	0.39	(2.73)	1.51	(10.8)	4.46	(31.7)	0.44	(1.49)	1.54	(5.42)	4.46	(15.5)

Underlining indicates potential population supporting capacity less than 1975 and/or 2000 population.

Figures in parenthesis show the ratio of potential to present population, year 1975 and potential to projected population, year 2000.

Summary and Conclusions

The ability of land to produce food is limited and the limits of production are set by soil and climatic conditions and by the crop and technology employed. Any 'mining' of land beyond these limits leads to land degradation and reduced productivity. Accordingly, there are critical levels of populations that can be fed from any specific land area. Once the upper level of technology has been reached, any attempts increase food production in excess of these critical levels can only result in failure. Degradation of land, hunger and eventual reduction in population are the outcome of such practices.

Estimates of the potential population supporting capacities of lands, at the global level, are being made to identify areas where land resources are insufficient to meet the food needs of the people living in them. Results for Africa show that the continent as a whole has sufficient rainfed cultivatable land for food self sufficiency. Given only a low level of inputs, the combined potential productivity from all 51 countries could feed 50 per cent more people than the projected for the year 2000. At an intermediate input level of technology, the land resources could adequately provide for more than 5 times the estimated future population. However this would require a massive movement of food between and within countries or a major movement of people.

At the individual zone and country level, the situation markedly changes due to the very large differences in land resource endowment. At the country level it is estimated that the land resources of 13 countries are insufficient to provide for the food needs of their year 2000 populations, even if intermediate input levels were obtained by that date. It is further estimated that four countries have insufficient land resources to meet the food needs of their future populations, under high input levels.

While it is not yet possible to make satisfactory population projections at the zone level, comparison of zone potential population supporting capacities with present populations indicate the present situation. In large areas of the warm tropical lowlands, present population densities are generally less than the potential population supporting capacities of the land.

One major exception is however apparent, namely the drier lands comprising growing period zones of less than 150 days which, on average, are already carrying twice the number of people that can be supported without land degradation under a low level of input. The present density is 0.08 persons per hectare, the potential population supporting capacity is 0.04 persons per hectare. Even under intermediate input conditions some of these zones in specific countries remain critical, as do all zones with less than 75 day growing periods. The present density of such zones is 0.04 persons per hectare; the potential is 0.02 persons per hectare.

Another, but less well recognized major critical area occurs in the highland areas with benign moderately cool and cool climates. Six countries are principally involved and, in these, the majority of all growing period zones are already carrying more people than the land resources can support under low input levels. The current density is 0.31 persons per hectare. The potential population supporting capacity of these zones is 0.20 persons per hectare under low input levels. Even with attainment of intermediate input levels, many zones in these climates will remain critical and, in specific countries, some zones will remain critical even at the high input levels.

Three solutions are possible in the latter circumstance (critical at high levels of inputs) and four in the former circumstance (critical at intermediate levels of inputs). For those areas already carrying more people than the land resources can support at the high input level, solutions involving population planning, food importation or major land improvements, are among the long-term remedies. Continuation of the present situation can only lead to accelerated worsening condition through land degradation, declining productivity and malnutrition.

In areas where the situation is critical at the intermediate input level, a further possibility is apparent namely raising the input level to attain additional production. The economics of this and of major land improvements however, require careful investigation.

The present recognition of critical areas identified locations where more detailed work, incorporating aspects outside the scope of this first general study, is required to ensure the well-being of present and future populations.

Chapter 16

ECONOMIC DISPARITIES ASSOCIATED WITH SOCIO-DEMOGRAPHIC DEVELOPMENT

An underlying theme of the 1970's has been a recognition that development is a complex, multi-dimensional process in which population factors play a major and sometimes decisive role. This recognition implies a need for co-ordinated economic and social action if the world's population is to fulfill its promise as an inexhaustible source of creativity. This view was formalized in various resolutions of the 1974 World Population Conference in Bucharest, which emphasized the need for a better understanding of population-development interrelations in order to facilitate policy formation and development planning. 1/

This study seeks to illuminate the linkages between population and development in two ways. One is to provide a broad assessment of global trends in selected economic and socio-demographic development indicators with an emphasis on the disparities between countries. The other is to review the interrelationships between economic progress on the one hand and socio-demographic development on the other. However, it is beyond the scope of this study to establish causal links between population and development variables. The findings drawn from this study should shed some light on socio-demographic aspects of current United Nations tasks in the context of the New International Development Strategy, a strategy dedicated to achieving a New International Economic Order. 2/

A. Introduction

International cross-section data for the years of 1960 and 1975 are used in this study. Projected development indicators for the year 2000 were also selectively highlighted. The choice of countries to be included in the study is based primarily on data availability. It consists of a

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1/ Report of the United Nations World Population Conference, 1974, Bucharest, 19-30 August 1974 (United Nations Publication, Sales No. E.75.XIII.3), [illegible]. Chapters I and II.

2/ United Nations, "Goals and objectives of the New International Development Strategy, preliminary consideration of policy measures in all fields arrangements for review and appraisal", prepared for the fourth session of the General Assembly, 11-29 February 1980, A/AC.196/10 [illegible] February 1980).

total of 114 countries and two sub-national entities, Puerto Rico and Hong Kong. 3/ In mid-1975 these countries, which are listed in Appendix A, had a total population of 3,410 million, or about 83 per cent of the world's population.

The study includes 27 developed market countries, 6 centrally planned economies of the Eastern Europe and the USSR, and 81 developing countries. The first two groups are referred to as the economically more developed countries (MDCs) and the third group as the economically less developed countries (LDCs). This classification was adopted for statistical purposes and does not necessarily reflect each nation's stage in the development process.

The developing countries were classified in two alternative ways. They were divided geographically into 5 regional groups and into countries which did and did not export petroleum. The developing countries included in this study are market economies with the exception of China and Vietnam, which have centrally planned economies. 4/

This chapter is divided into three major sections. First, development levels are presented, highlighting inter-country disparities in gross domestic product per capita, energy consumption and socio-demographic indicators. In the second section, inter-period changes in these disparities are examined. Concluding remarks are presented in the final section.

B. Levels of economic and socio-demographic disparities, 1975

The focus of this section is on the economic gaps between countries in terms of GDP, commercial energy consumption, social indicators and associated population characteristics.

3/ Although two of the units studied are sub-national entities, they will be referred to as countries throughout the remainder of the chapter to facilitate the exposition.

4/ Other centrally planned developing countries such as Cuba and the Democratic Republic of Korea were not included in this study because comparable GDP data for the years 1960 and 1975 were not available.

1. Population and gross domestic product

Table 16.1 indicates that in 1975, the developing countries as a group, comprising 72 per cent of the world's population, produced 20 per cent of the world GDP. In contrast, the developed market economies, comprising 19 per cent of the world's population, produced 65 per cent of the world's GDP and the centrally planned economies of Eastern Europe and the USSR comprising 9 per cent of the world's population, produced 15 per cent of world GDP. In 1975 *per capita* GDP of the developing economies was equal to $ 270 US dollars measured in 1970 prices. 5/ This amounted to about one twelfth that of the developed market economies and about one sixth that of the centrally planned economies of Eastern Europe and the USSR. In absolute terms the gap in GDP *per capita* between the developing and developed market economies was $ 2,938. The gap between the developing and planned economies of Eastern Europe and the USSR was $ 1,320 in 1975. *Per capita* GDP also differs markedly among developing countries. It appears from Table 16.2 that in 1975 the average *per capita* GDP was only $ 249 for the developing economies which are not petroleum exporters. This is $ 196 less than that of the non-petroleum exporting countries.

In some countries, such as Upper Volta, Rwanda, Ethiopia and Bangladesh, *per capita* GDP in 1975 was as low as $ 100. In contrast, some petroleum exporting developing countries such as the Libyan Arab Jamahiriya, Saudi Arabia and Kuwait, had reached the *per capita* GDP level of MDCs. In 1975, *per capita* GDP in these countries ranged from $ 2,500 to 11,000.

Disparities in *per capita* GDP are also reflected in the regional averages. They range from a high of $ 699 in Latin America to a low of $ 191 in South Asia. The latter figure however is more representative of developing regions as a whole. Oceania, the region with the second highest level of *per capita* GDP, has a level of $ 286,less than half that of Latin America.

The economic gap between the MDCs and LDCs is but a partial measure of world wide disparities in living standards. In Table 16.3 the 116 countries are ranked in ascending order according to *per capita* GDP and grouped into quintiles of total world population. In 1975, the 48 countries with the lowest GDP *per capita* had 60 per cent of the world population yet produced only 11 per cent of the world's GDP. The average

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5/ All GDP data presented in this chapter are expressed in United States dollars at 1970 constant prices. However, all observations are for the year 1975 or 1960.

Table 16.1 Distribution of world population and gross domestic product (GDP) by major country groups, 116 countries, 1975

Country groups	Number of countries included	Population		Gross domestic product		
		Number (Millions)	Distribution (Percentage)	Total (billions of US dollars) a/	Distribution (Percentage)	Weighted average GDP per capita (US dollars) a/
All countries	116	3910	100	3760	100	960
Developed market economies	24	758	19	2434	65	3200
Developing economies	82	2791	72	753	20	270
Centrally planned economies of Eastern Europe and USSR	10	361	9	573	15	1590

Sources : Computed from various data sources; primarily United Nations publications.

a/ All GDP figures expressed in 1970 prices.

Table 15.2 Distribution of population and gross domestic product (GDP) by geographic regions and by type of economy, 82 developing countries, 1975

Country groups	Number of countries included	Population		Gross Domestic Product		
		Number (Millions)	Distribution (Percentage)	Total (billions of US dollars) a/	Distribution (Percentage)	Weighted average of GDP *per capita* (US dollars) a/
Developing **economies**	82 b/	2791	100	753	100	270
By geographic regions						
Africa	31	328	12	66	9	200
Latin America	24	311	11	217	29	699
East Asia	3	934	33	[illegible]	31	254
South Asia	22	1215	44	232	31	191
Oceania	2	3	1	1	-- e/	286
By types of economies						
Petroleum exporting c/ countries	12	292	10	130	17	445
Non-petroleum d/ exporting countries	70	2499	90	623	83	249

Sources: Computed from various data sources, primarily United Nations publications.

a/ All GDP figures expressed in 1970 prices.

b/ Including non-national entities such as Hong Kong and Puerto Rico.

c/ The 12 petroleum exporting countries included in this study are Algeria, Ecuador, Gabon, Indonesia, Iran, Iraq, Kuwait, Libyan Arab Republic, Nigeria, Saudi Arabia, Trinidad and Tobago and Venezuela.

d/ The 70 non-petroleum exporting countries include all other countries not listed above in the developing economies which are listed in Appendix A.

e/ Less than 1 per cent.

Table IV.3 Quintile distribution a/; highest and lowest decile by major country groups, 116 countries, 1975

Population quintile (percentage)	Number b/ (all countries)	GDP Share (Percentage)			
		All Countries	Developed market economies	Developing economies	Centrally planned economies of Eastern Europe and the USSR
Total	116	100	100	100	100
I 0-20	11	2	8	7	17
II 20-40	22	4	14	8	19
III 40-60	15	5	19	17	20
IV 60-80	42	20	27	19	21
V 80-100	26	69	32	49	23
Decile (percentage)					
I 0-10	10	1	3	3	[illegible]
X 90-100	13	[illegible]	16	36	13

Sources : Computed from various data sources; primarily United Nations publications.

a/ The quintile distribution is computed on the basis of an estimated Lorenz curve.

b/ When the country falls between two quintiles, it is assigned to the quintile to which corresponds the higher share of its population.

per capita GDP of these countries was $ 175. In contrast, the remaining 68 countries with 40 per cent of the world's population produced 89 per cent of the total GDP. The average of per capita GDP of these countries was $ 2,138. This inequality can also be depicted in another way: the countries in the highest decile produced a share of world GDP which was more than 52 times that of the countries in the lowest decile. China and India, which comprise almost half of the world's population (being respectively 23 per cent and 16 per cent), also comprised the largest part of the two lowest quintiles. The United States, which had only about 5.5 per cent of the world's population, accounted for a larger share of the world GDP than any other country, a total of 29 per cent.

The conventional Gini coefficient is a summary measure of the degree of concentration of GDP with respect to all groups of the population. It has a value of zero if income is equally distributed, and of one if all income is concentrated in one population group. A value greater than .3 is commonly regarded as an indicator of a high degree of concentration. The Gini coefficients for 1975 are shown below :

Country groups	Estimated Gini coefficients
All countries	0.662
Developed market economies	0.259
Developing economies	0.441
Centrally planned economies of Eastern Europe and the USSR	0.053

Applied to all countries included in the study the Gini coefficient in 1975 was 0.662, indicating a high degree of concentration of the world GDP. 6/ Inequality also existed in the distribution of per capita GDP

6/ In this study, Gini coefficients were computed from data on national per capita GDP. They do not measure the disparities within countries and thus under-estimate the degree of inequality for all groups of the world population.

within each of the country groupings. Within the developing countries, developed market economies, and the centrally planned economies of Eastern Europe and the USSR, the respective Gini coefficients in 1975 were 0.441, 0.259 and 0.053. This indicates that within the group of the developing economies the per capita GDP distribution was most skewed, and that the corresponding distribution among the countries in the centrally planned economies of Eastern Europe and the USSR was least skewed. The low Gini coefficient in the latter case is due in part to the fact that the USSR accounts for 70 per cent of the group's aggregate GDP and 71 per cent of its population. Nevertheless, the disparities in per capita GDP are substantially smaller in this group than in the developed market economies and developing economies.

2. Energy consumption

Levels of energy consumption provide another indicator of the economic gap between developed and developing countries. Past studies have shown that energy consumption is closely related to national production, both in agriculture and industry. 7/ Table 16.4 indicates that the weighted (unweighted) average 8/ of world commercial energy consumption amounted to 2058 (1945) kilograms of coal equivalent per capita in 1975.

In 1975, commercial energy consumption in the developing countries was only at 470 kilograms of coal equivalent per capita, which amounted to about one thirteenth of the corresponding figure for the developed market economies and about one twelfth of the figure for the centrally planned economies of Eastern Europe and the USSR. Within the developing economies, the levels of energy consumption varied by geographical regions and by petroleum exporting status. It appears from Table 16.4 that in 1975, Latin America and Africa had the highest and lowest levels of per capita commercial energy consumption, respectively.

Differentials in per capita GDP and commercial energy consumption are crude measures of the economic gaps between developed and developing countries. Welfare implications drawn from these data must be qualified at least by three considerations. First, the use of market prices and

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7/ United Nations, Changing Patterns in the World Energy Situation, Committee on Natural Resources, 22 February - 5 March 1971, Note by the Secretary-General. (E/C.7/2/Add.1), 1971.

Table 16.4 Consumption of commercial energy per capita in 1975, by major country groups, by geographical regions and by type of economy, 116 countries

Country groups	Per capita consumption of commercial energy Weighted average	Unweighted average
	(Equivalent to kilogrammes of coal)	
All countries	2038	1945
Developed market economies	6207	4818
Developing economies	470	708
Centrally planned economies of Eastern Europe and the USSR	5444	5250
Developing economies		
By geographical regions		
Africa	214	277
Latin America	934	1004
East Asia	654	931
South Asia	270	332
Oceania	335	434
By types of economies		
Petroleum exporting countries	541	1830
Non-petroleum exporting countries	462	507

Sources: Computed from various data sources; primarily United Nations publications.

official exchange rates for conversion into a common currency (usually United States dollars) leads to major distortions in the evaluation of relative living standards. Alternative methods of comparing GDP levels across countries based on the relative purchasing power of currencies, would suggest that actual differences are probably much smaller. 9/ Nevertheless, even if the relative purchasing power of currencies were taken into account, significant disparities would remain. There are many other difficulties with *per capita* GDP, e.g. non-market transactions, employment costs, pollution, resource depletion, military expenses, index number problems. However, the fact remains that many people living in the developing countries lack adequate nutrition, housing, health services and education. 10/

Secondly, differences in *per capita* income between LDCs and MDCs exaggerate disparities in welfare due to the demographic factors such as differences in the age structure and size of the consumption unit. Since the needs of persons of different sex and age and households of different size are not the same, differentials in living standards may be less than that implied by differentials in *per capita* GDP. Based on a limited number of inter-country comparisons, income per equivalent adult consumer would be 10 or 20 per cent higher than *per capita* in developing countries. 11/

Third, *per capita* GDP and commercial energy consumption are but two measures of economic gaps. Alternative methods of measuring world-wide disparities have focussed on the concept of poverty, a multi-dimensional

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9/ Irving B. Kravis, Alan W. Heston and Robert Summers, "Real GDP per capita for more than one hundred countries", *The Economic Journal*, Vol. 88, No. 350, (June 1978), pp. 215-242.

10/ Over 460 million people, or about 12 per cent of world population in 1974 were under-nourished, of these at least 40 per cent were children. A recent FAO study based on normative scenario also revealed that numbers of population below the critical level of food intake would not fall below 240 millions over the next two decades. See United Nations, *The World Food Problem*, prepared for United Nations World Food Conference, Rome, 5-16 November 1974, E/CONF.65/4, (August 1974). FAO, 1979, *Agriculture:toward 2000*, C 79/24, Document prepared for twentieth session, Rome, 10-29 November 1979, July 1979.

11/ E. Kleiman, "Age composition, size of households, and the interpretation of *per capita* income", *Economic Development and Cultural Change*, Volume 15, No. 1, (October 1966), pp. 57-58.

phenomenon relating to societal norms and targets. Its components include life expectancy, nutrition, housing, other forms of consumption, education and skill formation. Though not all of these components can be summarized in a scalar measure, each can be regarded as a different aspect of poverty. Disparities in terms of selected socio-demographic indicators will be examined in the next section. Nevertheless, as stated by Hauser, 12/ "studies have shown a high correlation between LDCs meeting basic needs, or making progress toward basic needs objectives, and increases in GNP *per capita*".

3. Socio-demographic disparities

Having reviewed inter-country differences in GDP *per capita*, this section will explore their relation to gaps in levels of selected socio-demographic indicators for the year 1975. Findings based on country groupings for each of the selected socio-demographic factors will be presented, followed by findings concerning disparities among the developing economies.

Disparities between developed and developing countries

It has been generally recognized that a dichotomy between the LDCs and MDCs has existed with regard to fertility and mortality. But the degree of association between these demographic rates and levels of *per capita* GDP is much weaker than it once was. Other variables such as disease control and advanced medical techniques have become important factors contributing to mortality declines.

It appears from Table 16.5 that in 1975 the average total fertility rate (TFR) in the developing economies was 4.932 children per woman of child bearing age. This was 2.4 times that of the developed market economies and 2.1 times that of the centrally planned economies of Eastern Europe and the USSR. The weighted average of life expectancy at birth was 56 years for the developing countries, which was 22 and 20 per cent less than that of the developed market economies and the centrally planned economies of Eastern Europe and the USSR, respectively. Given these differentials in levels of

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12/ Philip M. Hauser, editor, World Population and Development, (Syracuse, New York : Syracuse University Press, 1979), pp. 35-36.

Table 16.5. Average *per capita* gross domestic product and demographic indicators, by country group, 116 countries, 1975

ry groups	*Per capita* GDP (US dollars)[a]		Rate of natural population increase (per 1,000)		Total fertility rates (children per woman of child-bearing age)		Life expectancy at birth (years)	
	Weighted[b]	Unweighted	Weighted[b]	Unweighted	Weighted[b]	Unweighted	Weighted[b]	Unweighted
tries	962	1,150	18.1	20.7	4.086	4.662	61	60
d market es	3,208	2,612	6.8	7.3	2.018	2.217	72	72
ng economies	270	627	22.3	26.4	4.932	5.671	56	55
y planned es of Eastern and USSR	1,590	1,636	8.8	6.6	2.362	2.265	70	70

: Computed from various data sources, primarily United Nations publications.

All GDP figures expressed in 1970 prices.

Average weighted by population size.

fertility and life expectancy between the LDCs and MDCs, one would expect that rates of natural increase in the former would be substantially higher than in the latter. The weighted (unweighted) average rate of natural increase of LDCs was 3.5 and 2.5 (3.6 and 4) times as large as the corresponding rates of the developed market economies and centrally planned economies of Eastern Europe and the USSR, respectively.

The overall association of economic disparities with disparities in fertility and life expectancy levels is also found in country configurations in this study, levels of *per capita* GDP were related to total fertility rate and to life expectancies at birth, respectively. The results are shown in Tables 16.6 and 16.7. In these tables each variable was classified into seven strata creating a total of 49 cells in each comparison. Tables 16.6 and 16.7 reveal two rather systematic, though not uniform patterns. A movement from lower to higher income strata is negatively associated with changes in total fertility rates and positively associated with changes in life expectancies at birth.

Two observations can be made concerning these country configurations. First, although most countries conform to the patterns described above, a number of countries deviate from them, revealing levels of fertility and life expectancy different from what would have been expected on the basis of their GDP *per capita*. This confirms that levels of *per capita* GDP cannot explain all inter-country differences in demographic behaviour. In terms of population size the most important example is China which has low levels of fertility and a high life expectancy compared with other countries in the income bracket of $ [illegible] - 54[illegible]. The total fertility rate in China, 3.502 children per woman of child bearing age and the life expectancy at birth, 64 years, are very close to the levels of countries which are in the *per capita* GDP stratum of $ [illegible] - [illegible]. Cyprus, Fiji, Mauritius and Sri Lanka, also have lower fertility rates than other countries in their respective GDP *per capita* strata. In contrast, petroleum exporting countries such as Saudi Arabia, Iran, Venezuela, Libyan Arab Jamahiriya and Kuwait as well as Israel and Surinam, had comparatively high fertility rates relative to other countries in their GDP *per capita* groups. That the oil countries do not follow the general pattern may be due to the fact that GDP is a measure of production not consumption, and that in the case of oil, GDP measures the sale of an asset.

Similarly, when compared with other countries in their own income strata, a substantial number of countries characterized by low *per capita*

Table 16.6. Configuration of countries according to total fertility rates (TFR) and per capita GDP, 116 countries, 1975

ertility tes	Countries in each total fertility rate group in which 1975 per capita GDP[a] was						
	Less than $100	$100-$199	$200-$349	$350 - $749	$750 - $1399	$1400 - $2599	$2600 and above
an 2.5				Cyprus	Yugoslavia Malta	Greece Hungary Bulgaria Poland USSR Italy Czechoslovakia Democratic Rep. of Germany Austria Japan United Kingdom New Zealand	Finland Netherlands Iceland Belgium France Australia Luxembourg Federal Republic of Germany Switzerland Denmark Norway Sweden Canada United States of America
2.9					Portugal Romania Singapore Uruguay Spain Hong Kong Argentina Trinidad & Tobago	Puerto Rico	

continued ...

Table 16.6. (continued)

al Fertility ates	Countries in each total fertility rate group in which 1975 per capita GDP[a] was						
	Less than $100	$100-$199	$200-$349	$350 - $749	$750 - $1399	$1400-$2599	$2600 and above
0 - 3.9		Sri Lanka	China Mauritius	Republic of Korea Fiji Chile Costa Rica		Ireland Israel	
- 4.9				Colombia Guyana Jamaica	Panama Gabon		
- 5.9	Burma Haiti Indonesia India	Comoros Vietnam Cameroon	Thailand Philippines Egypt Congo Paraguay	Guatemala Peru Dominican Republic Turkey Malaysia Lebanon Brazil	South Africa Venezuela		
- 6.4	Upper Volta Nepal Zaire	Tanzania Uganda Madagascar Sierra Leone Senegal	Papua New Guinea Botswana El Salvador	Ecuador Tunisia Mexico	Surinam		Kuwait

continued ...

Table 16.6. (continued)

. Fertility ates	Countries in each total fertility rate group in which 1975 per capita GDP[a] was						
	Less than $100	$100-$199	$200-$349	$350 - $749	$750-$1399	$1400 - $2599	$2600 and above
and over	Rwanda Ethiopia Bangladesh Malawi	Togo Yemen Sudan Kenya Mauritania Nigeria Pakistan	Ghana Morocco Jordan Honduras Bolivia Liberia Ivory Coast	South Rhodesia Syrian Arab Republic Algeria Nicaragua Zambia Iraq Iran		Libyan Arab Jamahiriya	Saudi Arabia

urce: Computed from various data sources; primarily United Nations publications.

a/ Gross Domestic Product in United States dollars measured in 1970 prices.

Table 16.7. Configuration of countries according to life expectancies at birth and *per capita* GDP, 116 countries, 1975

expectancy rth s)	Countries in each group of life expectancies at birth in which 1975 per capita GDP[a] was					
	Less than $100	$100-$199	$200-$349	$350 - $749	$750 - $1399	$1400 - $2599	$2600 and above
than 45	Upper Volta Rwanda Ethiopia Nepal Malawi Zaire	Togo Senegal Comoros Madagascar Yemen Sierra Leone Mauritania Cameroon	Congo Ivory Coast		Gabon		
9.9	Bangladesh Haiti Indonesia	Tanzania Sudan Vietnam Nigeria	Ghana Papua New Guinea Bolivia Liberia Botswana	Zambia			Saudi Arabia
.9	Burma India	Uganda Kenya Pakistan	Egypt Morocco Jordan	South Rhodesia Nicaragua Iraq Iran		Libyan Arab Jamahiriya	

continued ...

Table 16.7. (continued)

pectancy h	Countries in each group of life expectancies at birth in which 1975 per capita GDP[a] was						
	Less than $100	$100-$199	$200-$349	$350-$749	$750-$1399	$1400 - $2599	$2600 and above
.9			Thailand Philippines Honduras	Syrian Arab Republic Peru Algeria Dominican Republic Ecuador Guatemala Turkey Tunisia	South Africa		
.9			China Paraguay El Salvador	Korean Republic Colombia Malaysia Lebanon Brazil Mexico			
9		Sri Lanka	Mauritius	Guyana Chile Costa Rica Jamaica	Panama Trinidad Tobago Yugoslavia Portugal Uruguay Surinam Venezuela Argentina Romania Singapore	Hungary USSR	Kuwait

continued ...

Table 16.7. (continued)

Life expectancy at birth (years)	Countries in each group of life expectancies at birth in which 1975 per capita GDP[a] was						
	Less than $100	$100-$199	$200-$349	$350-$749	$750 -$1399	$1400 -$2599	$2600 and above
70 and over				Fiji Cyprus	Hong Kong Malta Spain	Ireland Bulgaria Poland Italy Czechoslovakia Puerto Rico Democratic Rep. of Germany Austria Japan Israel United Kingdom New Zealand Greece	Finland Netherlands Iceland Belgium France Australia Luxembourg Federal Rep. of Germany Switzerland Denmark Norway Sweden Canada United States of America

Sources: Computed from various data sources; primarily United Nations publications.

[a] **Gross Domestic Product measured in 1970 prices.**

GDP, had higher life expectancies. These countries include, China, Paraguay, El Salvador, Mauritius, Sri Lanka, Cyprus, Fiji, Jamaica and Costa Rica, with life expectancies at birth of over 60 years in 1975 while their levels of *per capita* GDP were less than $ 750. One explanation of the lower mortality in these countries is that they have been more successful than others in developing means and facilities for improving health, including improved social and economic conditions (other than income levels). In contrast, other countries had lower life expectancies than was usual for countries in their *per capita* GDP strata. These countries include Gabon, the Libyan Arab Jamahiriya, Zambia, Congo, Ivory Coast, Saudi Arabia and South Africa, where socio-demographic development in general may not have kept pace with rapid economic growth. 13/

Secondly, it appears from Tables 16.6 and 16.7 that two clusters of countries can be distinguished. At one end of the spectrum are the countries with a *per capita* GDP of $ 350 or less which have total fertility rates of five or more children per woman at child bearing age and life expectancies at birth of less than 55 years. At the other end of the spectrum are countries with *per capita* GDPs of $ 750 and more which have total fertility rates of three children and less per woman and life expectancies at birth of at least 65 years. These countries include all the MDCs and a few LDCs. Between the income strata of $ 349 - 750, the distributions involve a very wide range of fertility and mortality levels.

The income stratum of $ 350 - 749 deserves further attention. In this stratum there is a wide range of total fertility rates and life expectancies at birth. Total fertility rates in this group range from less than 2.5 in Cyprus to 6.5 and more for countries such as in Iran and Iraq. Similarly, life expectancies at birth range from less than 50 years in Zambia to more than 70 years in Fiji and Cyprus. Nevertheless, the majority of countries in this income stratum with *per capita* GDPs of $ 350 - 749 are in a transition stage approaching low fertility rates coupled with high life expectancy at birth.

The existence of the two clusters observed in this study is consistent with the threshold hypothesis, according to which fertility is little affected by the process of social and economic development until a certain level of development has been reached. At that time, the factors resistant to fertility decline have disappeared, and a significant reduction in fertility ensues.

13/ Most of these countries are petroleum exporters. Two other countries, the Congo and South Africa, are major mineral exporters. Thus, GDP for these countries may be inflated by the sale of resources.

Given the a priori classification of countries into seven strata of per capita GDP and total fertility rates, the data suggest that a per capita GDP level of $ 750 at 1970 prices, would be the threshold level for significant fertility reduction. Based on an a priori classification of income strata and the country configuration, a per capita GDP of $ 350 seems to be the dividing line between the pre-transition and the intermediate stage of demographic transition. The present country configuration with polar groups having low and high fertility rates and many countries in an intermediate position, could be interpreted as indicating that one group of countries had completed the transition to low fertility, another group had not yet attained the threshold level of transition, and a few countries are at present in the process of transition from high to low fertility levels.

While our findings are consistent with the threshold hypothesis, they must be qualified at least by two factors. First, per capita GDP is not a sufficient measure of socio-economic development; others will be examined later. 14/ Second, the threshold hypothesis is open to a priori objections on the ground that it is pre-occupied with the effects of socio-economic development on fertility and neglects the possible feed-back effects. In actuality, the transition to low fertility and the improvement of socio-economic conditions interact with each other. Moreover, efforts to identify thresholds for the initiation of fertility reduction are still at a preliminary stage and it should not be used for predictive purposes. 15/

Age structure and urbanization are among those demographic variables which are most closely related to economic development. They also reveal a contrasting pattern between the LDCs and MDCs. Changes in the age composition of the population will affect economic development since the

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14/ See W. Parker Mauldin and Bernard Berelson, "Conditions of fertility decline in developing countries, 1965-75", Studies in Family Planning, Vol. [illegible], No. [illegible] (New York: The Population Council, [illegible] 1978), [illegible]. Population Bulletin of the United Nations, No. [illegible], United Nations publication, Sales No. [illegible].XIII.[illegible]; Dudley Kirk, "A new demographic transition" in Rapid Population Growth: Consequences and Policy Implications. Baltimore, published for the National Academy of Sciences by the Johns Hopkins University Press, 1971, pp. [illegible]. R.S. Srikantan, The Family Planning Program in the Socio Economic Context. New York: The Population Council, [illegible].

15/ Kirk, op. cit., pp. [illegible].

productive performance of a country depends largely on its working age population. Furthermore, the age structure of a population will have an impact on consumption levels and patterns, since people at different ages have different needs.

The adult working age population ratio, defined as the number of persons aged 15-64 as a percentage of total population, is lower in the LDCs than in the MDCs. The table below shows that in the developing countries the adult working age population accounted for only 56 per cent of total population in 1975. This figure is 8 and 9 percentage points lower than that of developed market economies and centrally planned economies of Eastern Europe and the USSR respectively.

Adult working age ratio and proportion of the population urban by country group, 1975

Country groups	Adult working age ratio (Percentage)		Proportion of the population urban (Percentage)	
	weighted a/	unweighted	weighted a/	unweighted
All countries	58	57	39	46
Developed market economies	64	63	72	64
Developing economies	56	54	28	37
Centrally planned economies of Eastern Europe and USSR	65	65	60	58

a/ Country averages weighted by population size

Source : Computed from various data sources: primarily United Nations publications

In 1975, persons under age 15 made up about two fifths of the total population in the LDCs compared with only about one quarter of total population in the MDCs. Persons above age 65 made up only 4 per cent of the total population in the LDCs compared with about 11 per cent of the total population in the MDCs.

The difference in age structure can be a significant factor in explaining differentials in per capita GDP. Since the young and persons of retirement age are consumers but may not be producers, the greater their proportion in the population, the less is its capacity to produce and save likely to be, thus resulting in slower economic growth.

The difference between the age structures of the LDCs and MDCs is consistent with the differences in their fertility and mortality levels. The comparatively low proportion of the population of working age is attributed to the high fertility and mortality levels in the LDCs (see Table 16.5). Within the developing countries, there is a difference in the age structures of countries in the pre-transition and the intermediate transition stages of fertility change. For countries in the pre-transition stage with high fertility and mortality levels such as Upper Volta and Ethiopia, the proportion of the population under age 15 is comparatively low, resulting in an adult working age ratio of more than 52 per cent. In contrast, countries such as Surinam, where the ratio is 50 per cent, are in the intermediate stage of demographic transition, where the rate of mortality decline exceeds the rate of fertility decline. This configuration results in the high proportion of persons under age 15 and consequently in the comparatively low proportion of the population of adult working age.

Economic development, industrialization and urbanization are linked in a number of ways, but the scope of this study is confined to relationships between the proportion of the population which is urban and per capita GDP. The findings based on broad country groupings support the hypothesis that there is a positive association between the proportion of the population which is urban and levels of per capita GDP.

It appears from the table above that 39 per cent of the world's population were classified as urban dwellers in 1975. 16/ A majority of the population in the LDCs reside in areas classified as rural, while a

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16/ The urban population estimates in terms of agglomerations of population were compiled by United Nations Population Division from national sources, using the official definition of "urban" populations in each country. Urban definitions may vary greatly from one country to another and even vary from time to time within the same country, thus creating problems of international comparability. Such differences of definition are often believed to reflect differences in the characteristic features of urban and rural settlement considered most relevant in individual countries.

majority of the population in the MDCs resides in areas defined as urban. In 1975 the proportion of the population classified as urban was only 28 per cent in the LDCs, which was lower than the proportion pertaining in market economies and the centrally planned economies of Eastern Europe and the USSR by 44 and 32 percentage points respectively.

Urbanization is associated with a shift in employment from agricultural to non-agricultural economic activities. In such highly urbanized countries as the United Kingdom and the United States, with urban population ratios of 90 and 71 per cent, the proportion of the economically active population engaged in agriculture in 1975 was only 2.4 and 2.8 respectively. 17/ In contrast, countries such as Rwanda and Nepal which had urban population ratios of about 4 per cent in 1975 had approximately 93 per cent of their economically active populations engaged in agriculture.

Differentials exist not only in levels of GDP *per capita* and demographic variables, but also in other indicators of the quality of life. Striving for a better quality of life has been considered as important to development as is the pursuit of rapid economic growth although the two are closely related. Though the definition and statistical indicators of the quality of life are diverse, the indicators presented here are limited to secondary school enrollment ratios, population per physician, population per nurse and radio receivers per 1,000 persons.

The data on these indicators as presented in Table 16.8 reveal a sharp division between the educational, health and public communication facilities available in the LDCs and those available in the MDCs. The population per physician, for instance, is 7,061 persons in the developing economies, which is about 11 times that of the developed market economies and 17 times that of the centrally planned economies of Eastern Europe and the USSR.

The disparities among individual countries are, of course, greater than those indicated by group averages. In 1975 there were more than 36,000 persons per physician in countries such as Nepal and Rwanda, while there were less than 500 persons per physician in countries such as Austria and Greece. Similarly, disparities are reflected in school enrollment, population per nurse and radio receivers per 1,000 population.

17/ FAO, *1978 FAO Production Year Book*, FAO Statistics Series No. 22 (Rome, 1979), pp. 65-70.

Table 16.8. **Average levels of social indicators by major country groups, all 116 countries, 1975.**

Country **groups**	Secondary school enrollment ratios (percentage)		Persons per physician		Persons per nurse		Radio receivers per 1,000 persons	
	weighted[a]	unweighted	weighted[a]	unweighted	weighted[a]	unweighted	weighted[a]	unweighted
All countries	43	42	4,615	5,481	7,904	3,127	322	228
Developed market economies	82	80	663	661	257	255	814	432
Developing economies	28	30	7,061	7,767	9,878	4,646	86	149
Centrally planned economies of Eastern Europe and USSR	68	66	415	522	324	308	412	288

Sources: Computed from various data sources; primarily United Nations publications.

[a] **Country averages weighted by population size.**

Disparities among developing countries

Great disparities in terms of socio-demographic indicators exist not only between the LDCs and MDCs, but also within the group of LDCs. However, the association between levels of per capita GDP and levels of socio-demographic development is not as strong when the developing countries are examined separately by country groupings. That is, some developing countries have become more like MDCs in terms of their socio-demographic characteristics although their levels of per capita GDP remain quite low.

Great disparities exist between the socio-demographic characteristics of the petroleum exporting countries and other developing economies. According to Table 16.9 the average GDP per capita of petroleum exporting countries was 78 per cent higher than that of other countries in the developing world, yet total fertility rates in the former were higher by 23 per cent and life expectancy at birth was lower by 12 per cent. Natural rates of population increase were about 28 per cent higher in the petroleum exporting countries than in the others. Table 16.10 shows that in 1975, levels of social indicators in terms of secondary school enrollment ratios, persons per physician and radios per person were less favourable in petroleum exporting countries than in the other developing economies. This finding may explain why these countries have higher fertility and lower life expectancy than is usual for countries with similar levels of per capita GDP.

The diversity in living standards is also reflected in the regional averages. Of the five geographic regions, the developing economies of Africa and South Asia have the lowest levels of GDP and social indicators. The weighted average of per capita GDP was $ 200 and $ 191 in Africa and South Asia respectively. These low income levels were accompanied by high rates of natural population growth, low life expectancies at birth and inadequate school and health facilities. On the other hand, Latin America with a per capita GDP of $ 699 in 1975, relative to other developing regions, had a high life expectancy at birth (63 years), high secondary school enrollment ratios and low population per physician. In terms of social indicators, the population of Latin America is better served than those of Africa, South Asia and Oceania. It is closer to that of East Asia. Although these regional averages conceal inter-country differences, they do highlight the sharp contrast in levels of living in various parts of the developing world.

The data on East Asia are dominated by the statistics for China since its share of regional population is 96 per cent. Although Chinese per capita

Table 16.9 Average levels of per capita GDP and demographic indicators a/ by geographic regions and type of economy, 82 developing countries, 1975

Country groups	Average 1975 per capita GDP b/ (dollars)	Rate of natural population increase (per 1,000)	Total fertility rate (children per woman at child-bearing age)	Life expectancy at birth (years)	Adult working age ratio (percentage)	Proportion of the population which is urban (percentage)
Developing economies	270	22.3	4.932	56	56	28
By geographic regions						
Africa	200	28.7	6.493	48	52	25
Latin America	699	27.5	5.117	63	54	61
East Asia	254	15.1	3.512	63	60	25
South Asia	191	24.8	5.623	51	54	23
Oceania	286	24.7	5.567	52	55	21
By types of economies						
Petroleum exporting countries	444	27.8	5.932	50	52	30
Non-petroleum exporting countries	249	21.7	4.815	57	56	28

Source: Computed from various data sources; primarily United Nations publications.

a/ Country averages weighted by population size.

b/ United States dollars measured in 1970 prices.

Table 16.10 Average levels of social indicators a/, by geographic regions and type of economy, 82 developing economies, 1975

Country groups	Secondary school enrollment ratio (percentage)	Persons per physician	Persons per nurse	Radio receivers per 1000 persons
Developing economies	28	7061	9878	86
By geographic regions				
Africa	17	14517	3250	74
Latin America	31	1897	2828	249
East Asia	62	2000	1506	132
South Asia	29	7012	12402	39
Oceania	19	9721	- b/	524
By types of economies				
Petroleum exporting countries	22	13377	6402	79
Non-petroleum exporting countries	29	5921	10556	87

a/ All computations are based on averages weighted by the population share.

b/ No data available.

GDP remains quite low, their continuing improvement of health and sanitation measures has increased their life expectancies at birth to 63 years and their continuing efforts to limit population growth have reduced the total fertility rate to 3.502 children per woman. China is now approaching fertility levels achieved by developed economies such as Yugoslavia and Portugal. Moreover, the statistics on secondary school enrollment ratios, population per physician and population per nurse suggest that the developing economies of East Asia have markedly improved their social conditions and in that respect are now at a more advanced stage than Latin America and far ahead of other developing regions.

C. The growth of disparities between 1960 and 1975

1. Differentials in GDP per capita

The present study indicates that population growth has not prevented economic advance and modernization in developing countries but it has constrained the growth of *per capita* GDP. (See Table 16.11). Though total GDP grew more rapidly in the developing countries than in the developed market economies, *per capita* GDP growth in the developing countries lagged behind. Both total GDP and GDP *per capita* grew faster in the centrally planned economies than in the developing economies. During the period 1960-1975, the growth rate of GDP of the developing economies as a whole was 5.6 per cent per annum. This was 1.4 percentage points higher than that of the developed market economies but 1.0 percentage point lower than that of the centrally planned economies of Eastern Europe and the USSR. At the same time, the population in the developing economies grew at 2.3 per cent annually, which was more than double the rates of the developed market economies and the centrally planned economies of Eastern Europe and the USSR. Consequently, the rate of growth of GDP *per capita* in the developing countries was 3.2 per cent, which was slightly lower than the corresponding rate for the developed market economies and much lower than the rate for the centrally planned economies of Eastern Europe and the USSR.

Corresponding to the differential in rates of growth of GDP *per capita*, there also exists a differential in the absolute annual increments of GDP *per capita* between 1960 and 1975. The annual average increment was $ 7 for developing countries, which was about one eleventh of the annual increment of *per capita* GDP in the developed market economies and one eighth that of the centrally planned economies.

Table 16.11 Average annual rate of increase in population, aggregate GDP and GDP *per capita*, and average annual increment of GDP *per capita* by major country groups, 116 countries, 1960-1975

Country groups	Average annual compound growth rate (percentage)			Average annual increment of
	Population	Aggregate GDP	GDP *per capita*	GDP *per capita* (US dollars)a/
All countries	1.9	4.8	2.8	22
Developed market economies	1.0	4.2	3.3	80
Developing economies	2.5	5.6	3.2	7
Centrally planned economies	1.0	6.6	5.5	57

Sources: Compiled from various data sources; primarily United Nations publications.

a/ GDP *per capita* in U.S. dollars measured in terms of 1970 prices.

The absolute gap between the per capita GDP of the LDCs and MDCs has been widening substantially. For instance, the gap between the per capita GDP of developing economies and developed market economies was $ 2,936 in 1975, compared with $ 1,846 in 1960. This gap will widen to $ 9,000 in the year 2000 should the present trend of economic performance continue into the future. 18/ Unless rates of growth of the developing countries were to become much larger than those of the developing countries, 19/ it is virtually inevitable that the absolute difference in income would increase given the initial disparities. If the LDCs and MDCs were to grow at the same rate, the yearly increment in the per capita GDP of the latter would greatly exceed that of the former becuase of the higher base to which the growth rate of the latter applies. Unfortunately, during the period 1960 to 1975 GDP per capita in the LDCs was growing at a slightly slower rate than in the MDCs.

On the whole, the lower growth rates and smaller absolute increments of per capita GDP in the LDCs, and the consequent widening economic gap between the LDCs and the MDCs over the 1960-1975 period, have been linked to the more rapid expansion of population in the developing countries. However, a number of studies dealing with the relationship between the growth of population and the growth of per capita GDP using the data of individual countries have failed to reveal a similar association. 20/ Furthermore, the broad association found in this study does not prove that a reduction of population growth in developing countries will raise per capita output.

18/ The projected GDP for 2000 was not available for the centrally planned economies of Eastern Europe and the USSR as well as for some countries in developing and developed economies. The reported average is based on those countries for which data are available.

19/ The contrasts between trend and objectives and some of the reasons for the gap between them are contained in Long-term Development Objectives prepared for the fourth session of United Nations General Assembly on the New International Development Strategy, (A/AC.196/11), 17 December 1979.

20/ Richard A. Easterlin, "Effects of population growth on the economic development of developing countries", Annuals of the American Academy of Political and Social Sciences (Philadelphia, Pa.) Vol. 369, January 1967, pp. 98-108. J.C. Chesnais and A. Sauvy, "Progrés économique et accroissement de la population, une expérience commentée", Population 28, Juil-Oct 1973, pp. 843-857, Simon Kuznets, "Population and economic growth", Proceedings of the American Philosophical Society, Vol. III, No. 3 (Philadelphia, Pa.) June 1967, pp. 170-193.

Past investigations of whether substantial population growth facilitated or constrained the growth of output were inconclusive. On the one hand, the supply of labour in developing countries may be abundant as a result of rapid population growth. Thus the size of the labour force is not a constraint on economic growth, as may be the case in the economically more developed economies. On the other hand, productive capacity, particularly capital equipment, may be limited giving rise to a labour surplus. Moreover, potentials for capital formation may have been constrained by the pressure of total consumption requirements, (although *per capita* consumption still remains very low), as a result of rapid population growth.

World wide disparities in GDP *per capita* are determined not only by economic gaps between the MDCs and the LDCs but also by inequalities within each group of countries. Table 16.12 indicates that the annual population growth rate for the non-petroleum exporting countries was 2.3 per cent during 1960-1975 as compared to 2.8 per cent in the case of the 12 petroleum exporting countries. The average annual rate of growth of *per capita* GDP for the former was 2.7 per cent, which was 3.9 percentage points below that of the latter during the same period. The sluggish GDP growth of many non-oil exporting developing countries such as India, Bangladesh and some countries in Africa was partly due to set-backs in the agricultural sector and to international oil price increases. Conversely, those price increases were a major factor in the rapid growth in the GDP of the oil exporting countries.

The pattern of disparities is also reflected in the regional averages. East Asia, the most populous developing region, contains about one third of the people of all developing countries. The annual rate of increase of population between 1960-1975, was 1.8 per cent in East Asia, a rate substantially lower than that of other regions in the developing economies. But East Asia's total and *per capita* GDP growth rates were slightly below the over-all average for developing countries. In the other four regions the annual average rates of population growth in 1960-1975 were in the range of 2.5 to 2.8 per cent. Though population growth rates were similar, the growth rates of total and *per capita* GDP varied significantly between regions, from 1.0 per cent in the case of Oceania to 3.9 per cent in the case of South Asia. The relatively high rate of GDP growth in South Asia is due in part to presence of many petroleum exporting countries.

Table 16.12 Average annual rate of increase in population, gross domestic product, GDP *per capita*, and average annual increments of GDP *per capita* by geographic regions and by type of economy, 82 developing countries, 1960-1975

Country groups	Average annual growth rate (percentage)			Average annual increment of GDP *per capita* (US dollars) a/
	Population	Aggregate GDP	GDP *per capita*	
Developing economies	2.3	5.6	3.2	6.8
By geographic regions				
Africa	2.7	4.9	2.2	3.7
Latin America	2.8	6.0	3.1	17.3
East Asia	1.8	4.6	2.7	5.6
South Asia	2.5	6.5	3.9	5.6
Oceania	2.7	3.5	1.0	2.1
By types of economies				
Petroleum exporting countries	2.8	9.6	6.6	18.3
Non-petroleum exporting countries	2.3	5.0	2.7	5.4

Sources: Compiled from various data sources; primarily United Nations publications.

a/ GDP in United States dollars measured in 1970 prices.

The disparity has been increasing slightly in that the Gini coefficient increased by 0.007 during the period of 1960 to 1975. Moreover, the relative position of the poorest countries worsened slightly; the GDP share of countries with the lowest per capita GDP, having 60 per cent of world's population, decreased from 13 per cent in 1960 to 11 per cent in 1975.

Within the developing countries, the Gini coefficient increased from 0.349 in 1960 to 0.441 in 1975. In 1975 the countries with the lowest per capita GDP and 20 per cent of population accounted for only 7 per cent of the GDP of the developing economies. This is a decrease of 4 percentage points from 1960. It must be noted, however, that in reviewing these interperiod changes, that individual countries may have shifted from a lower to higher income groups or vice versa.

Estimated Gini coefficients by major country group, 1960 and 1975

Country groups	1960	1975	Increment 1975 minus 1960
All countries	0.655	0.662	.007
Developed market economies	0.337	0.259	-.078
Developing economies	0.349	0.441	.092
Centrally planned economies of Eastern Europe and the USSR	0.108	0.053	-.055

Source: Computed from various data sources; primarily United Nations publications

Analysis of variance can be used to assess quantitatively the proportion of the disparity accounted for by the above factors, which may be referred to as the between group effect and the within group effect, respectively. Since the total measure of disparities used in the analysis of variance is not comparable with the Gini coefficient, the statistics presented below will be confined to the relative proportion of the variance accounted for by the "between" and "within" group effects.

National rates of economic growth have varied substantially within each country grouping used in this study. As shown in the table below, this is the major factor in the trend toward increasing disparities in GDP per capita. In 1975, 30 per cent of the total variation in the inter-country per capita GDP was due to the between group effect, that is, the variation between the developed market economies, the developing economies and the centrally planned economies of the Eastern Europe and the USSR. The remaining 70 per cent of the variance was accounted for by the within group effect, that is the disparities among countries within each of the groupings.

Components of world wide GDP disparities as measured by variance analysis, 116 countries, 1960 and 1975

Year	Proportion of total variance accounted for by the between group effect	Proportion of total variance accounted for by the within group effect
1960	39	61
1975	30	70

Sources : Computed from various data sources, primarily United Nations publications

The table also indicates that the between group effect decreased by 9 percentage points during 1960-1975. Consequently, the relative importance of the within group effect in explaining the world wide disparities increased by 9 percentage points. This decline in the relative importance of the between group effect during 1960-1975 is consistent with the observation that the per capita GDP in the LDCs as a ratio of that of the MDCs has slightly decreased.

2. Disparities in energy consumption

Given growing population, the growth in *per capita* output is largely dependent on increases in energy consumption. The increasing use of energy is also associated with increasing urbanization and industrialization.

Table 16.13 indicates that *per capita* world commercial energy consumption underwent an increase of 2.2 per cent per annum between 1960 and 1975. The rate of growth of *per capita* commercial energy consumption was 1.6 per cent in LDCs. This was lower than the corresponding rate for developed market economies by 1.3 percentage points and of centrally planned economies by 2.7 percentage points. 21/ The low growth rate of *per capita* energy consumption in LDCs was in part due to the very low growth rate in China during the period under study. 22/ When the data for China are excluded from the computation, the growth rate of commercial energy consumption *per capita* in LDCs was 3.4 per cent, a figure which exceeds the corresponding rate for the developed market economies.

Within the developing economies, rates of growth of energy consumption also varied by geographical regions and by petroleum exporting status. It appears from Table 16.13 that the average annual growth rate of commercial energy consumption *per capita* between 1960 and 1975 was as high as 5.9 per cent in petroleum exporting countries, which exceeded the corresponding figure in non-petroleum exporting countries by about a factor of five.

3. Disparities in socio-demographic indicators

The following discussion is concerned with the relationship between changes of GDP *per capita* and selected socio-demographic indicators during the period of 1960 to 1975.

21/ Data on non-commercial energy are excluded because they are not available. This omission creates a bias in comparison between LDCs and MDCs since non-commercial forms of energy account for a much larger proportion of energy supply in the former than in the latter. This also creates a problem in measuring rates of growth of energy consumption over time within LDCs because of the shift from non-commercial to commercial energy consumption.

22/ The reported statistics of Chinese energy consumption in the United Nations *World Energy Supplies* is a preliminary estimate, and is not based upon official statistics from China.

Table 16.13 Rates of growth of consumption of commercial energy *per capita*, 1960-1975, by major economic groups, by geographical regions and types of economy, 116 countries

Country groups	Average annual growth rate, 1960-1975 (Based on weighted average) a/ (Percentage)
All countries	2.2
Developed market economies	2.9
Developing economies	1.6
Centrally planned economies of Eastern Europe and the USSR	4.3
Developing countries	
By geographical regions	
Africa	4.1
Latin America	2.8
East Asia	.3
South Asia	4.1
Oceania	2.1
By types of economies	
Petroleum exporting countries	5.9
Non-petroleum exporting countries	1.2

Sources: Computed from various data sources; primarily United Nations publications.

a/ Group averages formed by weighting country growth rates by country population.

To some extent the widening gap in GDP *per capita* between developed and developing countries is associated with changes in demographic patterns. The rate of population growth for the world as a whole did not change significantly between 1960 and 1975, this was due to the very slow decline in the rate of population growth in the LDCs. Table 16.14 shows that though the rate of natural increase in the LDCs, on average, decreased by -0.06 percentage points annually during 1960-1975, the size of the decrease was about .22 percentage points less than that of the developed market economies and .31 percentage points less than that of the centrally planned economies of Eastern Europe and the USSR. It is worthwhile noting that though the rate of natural increase is decreasing, it is still positive and therefore population will continue to increase but at a slower rate.

Comparison of 1960 data with 1975 data shows that all but three of the countries (Sri Lanka, Fiji and Guyana) with a life expectancy at birth of 60 years in 1960 had a *per capita* GDP above $ 400. However, in 1975 many countries with *per capita* GDP as low as $ 200 had achieved the same life expectancy at birth. A particular value for life expectancy, say 60 years, was associated with a lower *per capita* GDP in 1975 than was the case in 1960. This shift might be explained, as suggested earlier, by factors other than income, particularly programmes in public health and disease control.

A related finding is that in 1975 a lower level of *per capita* GDP is associated with a lower level of the birth rate than was the case in 1960. This shift could also be explained by non-income factors such as the reduction in infant mortality, the increase in education levels, the improvement in the status of women and more effective fertility reduction programmes.

An additional factor determining profiles of change in demographic indicators during the 1960-1975 period is the asymptotic nature of demographic trends. Generally speaking, countries with high rates of fertility have a smaller potential for further increases. Similarly, countries with low fertility rates have limited possibilities for further declines. A similar asymptotic pattern may exist with respect to increases in life expectancy. It appears from Table 16.14 that between 1970 and 1975 the annual increase of average life expectancies at birth in the LDCs

Table 16.14 Average annual increments of demographic indicators, by major country groups, 116 countries, 1960-1975

Country groups	Average annual increments a/			
	Natural population increase rates (per 1,000)	Life expectancy at birth (years)	Adult working age ratios (percentage points)	Average urban population proportion (percentage points)
All countries	-0.09	0.40	0.00	0.33
Developed market economies	-0.28	0.20	0.07	0.49
Developing economies	-0.06	0.53	0.00	0.41
Centrally planned economies of Eastern Europe and the USSR	-0.37	0.15	0.13	0.77

Source: Computed from various data source; primarily United Nations publications.

a/ Country averages weighted by population size

(0.53 years) was .33 years greater than the annual increase in the developed market economies and .4 years greater than that of centrally planned economies of East Europe and the USSR.

The ratio of adult working age to total population in the LDCs remained more or less constant during the 1960-1975 period, indicating that the population under age 15 has increased in the same proportion as the population aged 15-64. This was a result of fertility decrease which was matched by a proportionate decrease in mortality.

There were significant differences in the rates of change among developing countries. Table 16.15 shows that annual decrements in the rate of natural increase (-.038) were greatest in East Asia, due largely to the trend in China. That region also achieved the largest gains in life expectancy at birth with an average annual increase of 0.67 years between 1960 and 1975. The largest annual increments to the rate of natural increase occurred in the case of Africa (0.25). The smallest annual increment in life expectancy (.40 years) was recorded in the case of Latin America.

A sharp contrast also exists between developing countries which export petroleum and those that do not. Increments in per capita GDP were more than three times higher in the former countries. Rates of natural increase were rising in the former while falling in the latter in spite of the fact that the annual increments to life expectancy were greater in the non-oil exporting developing countries.

The proportion of the population which is urban has increased between 1960 and 1975 in all major country groups. The average increments in that proportion was .41 percentage points in developing countries and .49 percentage points in developed market economies. The largest annual increment (.77 percentage points) occurred in the case of the centrally planned countries of Eastern Europe and the USSR. These data indicate that differentials in the proportion of the population which is urban between the developing and developed market economies are not widening as in the case of other demographic variables. And there seems to be no clear relationship between increments in per capita GDP and increments in the proportion of the population which is urban.

Health facilities have been continuously improved both in the LDCs and in the MDCs but Table 16.16 shows that the numbers of physicians and nurses have been increasing at a faster rate than the population as a whole

Table 16.15 Average annual increments of per capita GDP and demographic indicators by geographic regions and by type of economy, 82 developing economies, 1960-1975

Country groups	Average annual increments a/				
	Per capita GDP (US dollars) b/	Natural population increase rates (per 1,000)	Life expectancy at birth (years)	Adult working age ratio (percentage points)	Average urban population proportion (percentage points)
Developing economies	6.8	-0.06	0.53	0.00	0.41
By geographic regions					
Africa	3.7	0.25	0.47	-0.13	0.51
Latin America	17.3	-0.06	0.40	0.00	0.79
East Asia	5.6	-0.38	0.67	0.12	0.35
South Asia	5.6	0.09	0.47	-0.07	0.29
Oceania	2.1	0.13	0.51	0.00	0.94
By types of economies					
Petroleum exporting countries	18.3	0.13	0.47	-0.13	0.56
Non-petroleum exporting countries	5.4	-0.08	0.53	0.00	0.39

a/ Computation is based on weighted average by the population share.

b/ Per capita GDP in United States dollars measured in 1970 prices.

Table 16.16 Average annual increments of social indicators by major country groupings, 116 countries, 1960-1975

Country groups	Average annual increments a/			
	Secondary school enrollment ratios (percentage points)	Persons per physician	Persons per nurse	Radio receivers per 1000 persons
All countries	0.60	-21	85	15
Developed market economies	1.27	-9	-9	39
Developing economies	1.07	-322	-57	4
Centrally planned economies of Eastern Europe and the USSR	0.27	- b/	- b/	- b/

Source: Computed from various data sources; primarily United Nations publications.

a/ Country averages were weighted by population size.

b/ Data for 1960 not available.

in developing countries. As a result, the ratio of population to physicians and population to nurses has been falling in the LDCs. The annual decrease is 322 persons per physician and 57 persons per nurse during 1960-1975. These decreases have been substantially larger in absolute terms than the corresponding decreases in the MDCs. This is to be expected since the MDCs, with a low number of persons per physician and nurse, have limited room for further improvements. Despite such differentials in rates of improvement, the gaps between the LDCs and MDCs will continue to be large for some time if current trends continue.

Progress has also been made with regard to education. The LDCs have adopted a variety of measures to expand and strengthen their systems of education. Nevertheless, the annual percentage increase in secondary school enrollment ratios in the LDCs was smaller than in developed market economies between 1960 and 1975 but they were greater than in the centrally planned economies of Eastern Europe and the USSR.

Within the group of developing countries, changes in per capita GDP between 1960 and 1975 were not associated in a uniform way with changes in socio-demographic indicators (see Table 16.17). During the period 1960 to 1975 increments of per capita GDP in petroleum exporting countries were greater than those in non-petroleum exporting countries and the petroleum exporting countries made the greatest progress in terms of the annual change of population per physician and per nurse. However, they made less progress than the other developing countries in terms of their annual change in natural population growth rate and life expectancy at birth.

Improvements in quality of life in terms of changes in school enrollments and population per physician and population per nurse varied by geographical regions as well as by petroleum exporting status. This may in part be due to development strategies and country programmes. The average annual increments of secondary school enrollment ratios were as high as 2.3 percentage points in East Asia during 1960-1975, more than twice the corresponding changes in the other regions which had annual increments in the neighbourhood of 1.00 percentage points. Regarding changes of population per physician and population per nurse, it seems that the data conforms to an asymptotic pattern. For instance, Latin America with the lowest ratio of population per physician had an average annual decrease of 19 persons per physician during 1960-1975, which was far less than that of the decreases of 974 persons and 288 persons, respectively, in Africa and South Asia.

Table 16.17 Average annual increments of socio-demographic indicators by geographic regions and by type of economy, 82 developing economies, 1960-1975

Country groups	Average annual increments a/			
	Secondary school enrollment ratios (percentage points)	Persons per physician	Persons per nurse	Radio receivers per 1000 persons
Developing economies	1.1	-322	-57	4
By geographic regions				
Africa	0.8	-974	-84	4
Latin America	1.1	-19	-14	10
East Asia	2.3	-67	-114	11
South Asia	1.1	-288	-95	2
Oceania	1.0	-172	- b/	31
By types of economies				
Petroleum exporting countries	1.0	-1370	-104	4
Non-petroleum exporting countries	1.1	-119	-51	4

a/ Computation is based on weighted average by the population share.

b/ Data for 1960 not available.

On the average, improvements in health facilities in terms of changes in population per physician and population per nurse were greater in petroleum exporting countries than non-petroleum exporting countries. However, increments of secondary school enrollment ratios were almost the same in both types of economies.

D. Concluding remarks

The cross-sectional analysis based on 1975 data and the inter-period comparisons on the basis of data for 1960 and 1975 generally confirm the findings of earlier studies. Wide disparities in the *per capita* GDP and commercial energy consumption continued to exist in 1975 and these disparities, instead of being reduced, have increased slightly between 1960 and 1975, implying a widening of the gap in *per capita* GDP between the developed and the developing countries. Inter-country disparities also exist between developing countries grouped according to geographical regions and according to petroleum exporting status. In general, the countries with the lowest *per capita* GDP experienced the most rapid growth of population.

Inter-country differences exist not only with respect to levels of income, energy consumption and demographic indicators, but also in other indicators of the quality of life. Although great and continuing efforts have been made in the LDCs directed toward the improvement of educational and health facilities, their levels of social services lag far behind that of the MDCs. The disparities among countries are greater than those indicated by group averages.

Although there is a clear dichotomy between the levels of socio-demographic variables in the LDCs and MDCs, a substantial number of countries deviate from the general patterns. These departures from the averages of the respective country or income groups indicate that institutional, cultural and socio-economic factors as well as public programmes and policies in such fields as health and family planning have exerted an impact on demographic behaviour. In particular, the socio-demographic indicators of the petroleum exporting countries tend to be lower than the average for countries with similar levels of GDP *per capita*.

Though the levels of *per capita* GDP based on broad country groupings are generally, though not uniformly, associated with levels of socio-demographic indicators, these population and development interrelationships are not always apparent when changes for the period 1960-1975 are examined. This analysis also indicates that given levels of fertility and mortality are associated with a lower level of per capita GDP in 1975 than in 1960. This suggests a possible shift in the relationship between income and demographic factors due to changes in variables other than income. Although the role of income and economic growth in demographic change cannot be ignored, this finding and others lend support to the view that income levels and changes are not sufficient to fully explain differences in demographic behaviour amongst countries. Income may be only a proxy variable reflecting a variety of aspects of average standards of living which exert an influence on demographic trends.

The inter-period changes of socio-demographic indicators by country groupings, may also reflect the asymptotic nature of socio-demographic trends. Countries with high rates of fertility and mortality and low levels of education and health facilities, have a greater potential for further improvements than countries at a high level of development.

If the demographic trends experienced by the developing countries in recent years persist, their populations will continue to increase at a high rate. Such rapid population growth would have far reaching implications for food requirements, for material production, for services that would improve quality of life and for mobilization and allocation of resources to meet increasing socio-economic requirements. Declines in birth rates are likely to cause changes in age structure which would also have significant socio-economic implications. Since age structure has a considerable bearing on the proportion of the population which is economically active and determines requirements for education facilities, housing and health services.

In LDCs the proportion of the population which is urban, though at present lower than that of the MDCs has increased rapidly. Such rapid urbanization has created a variety of strains and social costs, including the growth of slums, the shortage of schools and hospitals, and the overloading of transportation facilities.

Although the LDCs have made significant progress in respect to their education systems and health facilities, these improvements have not yet met the rapidly increasing requirements. Were current trends to continue, shortages of these facilities would remain pressing and social services in the LDCs would continue to lag behind those in the MDCs and intercountry differences within the LDCs would remain large. These facts suggest that a slackened pace of population growth could be a significant component of a strategy to accelerate the pace of social and economic growth in the developing world; and that this will be true for many years to come.

ANNEX 1

LIST OF COUNTRIES INCLUDED

Country groups	Number of countries	Name of country
Developed market economies	27	Belgium, Denmark, France, Federal Republic of Germany, Ireland, Italy, Luxembourg, Netherlands, United Kingdom, Austria, Finland, Iceland, Norway, Portugal, Sweden, Switzerland, Greece, Malta, Spain, Yugoslavia, Australia, New Zealand, Canada, United States, Israel, Japan and South Africa.
Centrally planned economies of the Eastern Europe and the USSR	7	Bulgaria, Czechoslovakia, German Democratic Republic, Hungary, Poland, Romania and the Soviet Union.
Developing countries	82	
Africa	31	Algeria, Botswana, Comoros, Congo, Egypt, Ethiopia, Gabon, Ghana, Ivory Coast, Kenya, Liberia, Libyan Arab Jamahiriya, Madagascar, Malawi, Mauritania, Mauritius, Morocco, Nigeria, Rwanda, Senegal, Sierra Leone, South Rhodesia, Sudan, Togo, Tunisia, Uganda, United Republic of Cameroon, United Republic of Tanzania, Upper Volta, Zaire and Zambia.
Latin America	24	Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico 1/, Surinam, Trinidad and Tobago, Uruguay and Venezuela.
East Asia	3	Hong Kong 1/, Republic of Korea, China.

Annex 1 (continued)

Country groups	Number of countries	Name of country
Developing countries		
South Asia	22	Cyprus, Iran, Iraq, Jordan, Kuwait, Lebanon, Saudi Arabia, Syrian Arab Republic, Turkey, Yemen, Bangladesh, Burma, India, Indonesia, Malaysia, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand and Socialist Republic of Vietnam.
Oceania	2	Fiji and Papua New Guinea.

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[1] Puerto Rico and Hong Kong are entities.

ANNEX 2

SOURCES OF DATA

Data used are from different sources, mostly from the United Nations publications. All figures on demographic indicators are from United Nations, World Population Trends and Prospects by Country, 1950 - 2000 : Summary Report of the 1978 Assessment. ST/ESA/SER.R/33, New York, 1979, prepared by the Population Division. With the exception of GDP, all other socio-economic indicators are from the following sources : United Nations, World Energy Supplies, 1950-1974, (United Nations publication, Sales No. E.76.XVII.5), New York, 1976, UNESCO, Statistical Yearbook, Paris, 1979; WHO, 1960-1975 with every 5-year, World Health Statistical Annual, Geneva; World Table 1976, published for World Bank, Baltimore and London : The Johns Hopkins University Press, 1976; United Nations, World Statistics in Brief, United Nations publication, Sales No. E.78.XVII.9, New York, 1978; ILO, 1977, Labour Force, 1950-1970, 1975-2000, Geneva.

For the data on GDP, with the exception of the centrally planned economies of Eastern Europe, the USSR and China, all figures are from United Nations, Yearbook of National Accounts Statistics, 1978, United Nations publication, Sales No. E.79.XVII.8, New York, 1979. Some data not reported in the Yearbook were made available by the Statistical Division of the United Nations. For the centrally planned economies of Eastern Europe and the USSR, it is well known that the concept of NMP (net material product), is not directly comparable with the concept of GDP (gross domestic product), thus requiring adjustments for the purpose of international comparison. To arrive at our present estimates of 1960 and 1975 GDP at 1970 prices for these countries, the data used are estimates made by ECE (Economic Commission for Europe of the United Nations), where all allowances for depreciation and non-materials services are added to the reported data of NMP. See United Nations Economic Survey of Europe in 1969, Part I Structural Trends and Prospects in the European Economy, prepared by ECE, United Nations publication, Sales No. E.70.II.E.1, New York, 1970. The GDP data for Eastern Europe and the USSR and for the market economies have been currently revised by ECE. As the ECE revised data for market economies mentioned above have not been adopted in the Yearbook, it would not be appropriate at this time to use the ECE revised data of Eastern Europe and the USSR for the present study. Data for China are based on the estimates by Lau, et.al., and adjusted at 1970 prices. See Lawrence

ANNEX 2 (continued)

J. Lau, William W.F. Choa, Wuu-Long Lin and Jia-Dong Shea, "An econometric model of China", Working Paper, Department of Economics, Stanford Univeristy (January 1978). GDP data for year 2000 are from the projection by Projections and Perspective Studies Branch, IESA, United Nations. Four scenarios were projected. The one used in this study is based on the first scenario of trend assumption which did not assume any marked departure from past policies and performance of the developing countries.